User Guide
FastFabric 7.0

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Preface

Intended Audience

This manual is intended to provide network administrators and other qualified personnel a reference for installation, configuration and administration task information for the FastFabric Toolset.

Related Materials

- QLogic FastFabric Command Line Interface Reference Guide
- QLogic Fabric Software Installation Guide

Documentation Conventions

This guide uses the following documentation conventions:

- **NOTE:** provides additional information.
- ***CAUTION!*** indicates the presence of a hazard that has the potential of causing damage to data or equipment.
- ***WARNING!!*** indicates the presence of a hazard that has the potential of causing personal injury.
- Text in blue font indicates a hyperlink (jump) to a figure, table, or section in this guide, and links to Web sites are shown in underlined blue. For example:
  - Table 9-2 lists problems related to the user interface and remote agent.
  - See "Installation Checklist" on page 3-6.
  - For more information, visit www.qlogic.com.
- Text in **bold** font indicates user interface elements such as a menu items, buttons, check boxes, or column headings. For example:
  - Click the **Start** button, point to **Programs**, point to **Accessories**, and then click **Command Prompt**.
  - Under **Notification Options**, select the **Warning Alarms** check box.
- Text in `Courier` font indicates a file name, directory path, or command line text. For example:

- To return to the root directory from anywhere in the file structure: Type `cd /root` and press ENTER.
- Enter the following command: `sh ./install.bin`

- Key names and key strokes are indicated with UPPERCASE:
  - Press CTRL+P.
  - Press the UP ARROW key.
- Text in *italics* indicates terms, emphasis, variables, or document titles. For example:
  - For a complete listing of license agreements, refer to the *QLogic Software End User License Agreement*.
  - What are *shortcut keys*?
  - To enter the date type *mm/dd/yyyy* (where *mm* is the month, *dd* is the day, and *yyyy* is the year).
- Topic titles between quotation marks identify related topics either within this manual or in the online help, which is also referred to as *the help system* throughout this document.

License Agreements

Refer to the *QLogic Software End User License Agreement* for a complete listing of all license agreements affecting this product.

Technical Support

Customers should contact their authorized maintenance provider for technical support of their QLogic products. QLogic-direct customers may contact QLogic Technical Support; others will be redirected to their authorized maintenance provider. Visit the QLogic support Web site listed in Contact Information for the latest firmware and software updates.

For details about available service plans, or for information about renewing and extending your service, visit the Service Program web page at http://www.qlogic.com/services.

Training

QLogic offers training for technical professionals for all iSCSI, InfiniBand, and Fibre Channel products. From the main QLogic web page at www.qlogic.com, click the **Support** tab at the top, and then click **Training and Certification** on the left. The QLogic Global Training portal offers online courses, certification exams, and scheduling of in-person training.

Technical Certification courses include installation, maintenance and troubleshooting QLogic products. Upon demonstrating knowledge using live equipment, QLogic awards a certificate identifying the student as a certified professional. You can reach the training professionals at QLogic by e-mail at training@qlogic.com.

Contact Information

QLogic Technical Support for products under warranty is available during local standard working hours excluding QLogic Observed Holidays. For customers with extended service, consult your plan for available hours.For Support phone numbers, see the Contact Support link at support@qlogic.com.

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Knowledge Database

The QLogic knowledge database is an extensive collection of QLogic product information that you can search for specific solutions. We are constantly adding to the collection of information in our database to provide answers to your most urgent questions. Access the database from the QLogic Support Center: http://support.qlogic.com.

1 FastFabric Overview

Feature Overview

The FastFabric Toolset is designed to both simplify and expedite common InfiniBand (IB) cluster management tasks. FastFabric can assist in generic management tasks as well as InfiniBand installation, upgrade, configuration and verification tasks.

FastFabric has the following key capabilities:

- Accelerates initial fabric installation
  - Performs chassis and switch configuration
  - Verifies host management network connectivity
  - Verifies host OS levels
  - Sets up host and chassis ssh keys
  - Performs initial InfiniBand software installation
  - Configures Internet Protocol over InfiniBand (IPoIB) IP addresses
  - Performs InfiniBand driver upgrades or the installation of additional InfiniBand drivers
- Verifies key fabric installation matrixes:
  - Components in fabric
  - Link error counters
  - Link widths and speeds
  - InfiniBand and PCI bus bandwidth
  - InfiniBand end-to-end latency
  - IPoIB connectivity
  - Subnet Agent (SA) visibility of all nodes
  - InfiniBand connectivity of all switches and nodes
- Aids in diagnosis of fabric problems
  - Fabric error isolation

  - Fabric topology analysis and verification
  - Fabric route analysis
- Aids in ongoing fabric status and configuration monitoring
  - Fabric Performance, Error and congestion monitoring
  - Automated fabric health checks and configuration baseline compare
  - Automated chassis health checks and configuration baseline compare
  - Automated Subnet Management (SM) health checks and configuration baseline compare
- Provides tools to accelerate common host administration tasks
  - Executes commands across many hosts
  - Copies files to and from many hosts
  - Edits host-specific files across many hosts
- Provides tools to accelerate common chassis and switch administration tasks
  - Manage firmware levels on switches and chassis
  - Execute commands across many chassis
  - Administer switches
- Assists in the initial benchmarking and tuning of High Performance Computing (HPC) fabrics.

FastFabric includes both a Textual User Interface (TUI) menu system and command line tools. The TUI presents the menus in a typical order of execution for a new fabric install to simplify fabric installation for new users. All operations available in the TUI can also be accomplished using the command line. The command line tools are designed to permit customer-specific scripts to invoke the command line tools.

FastFabric Architecture

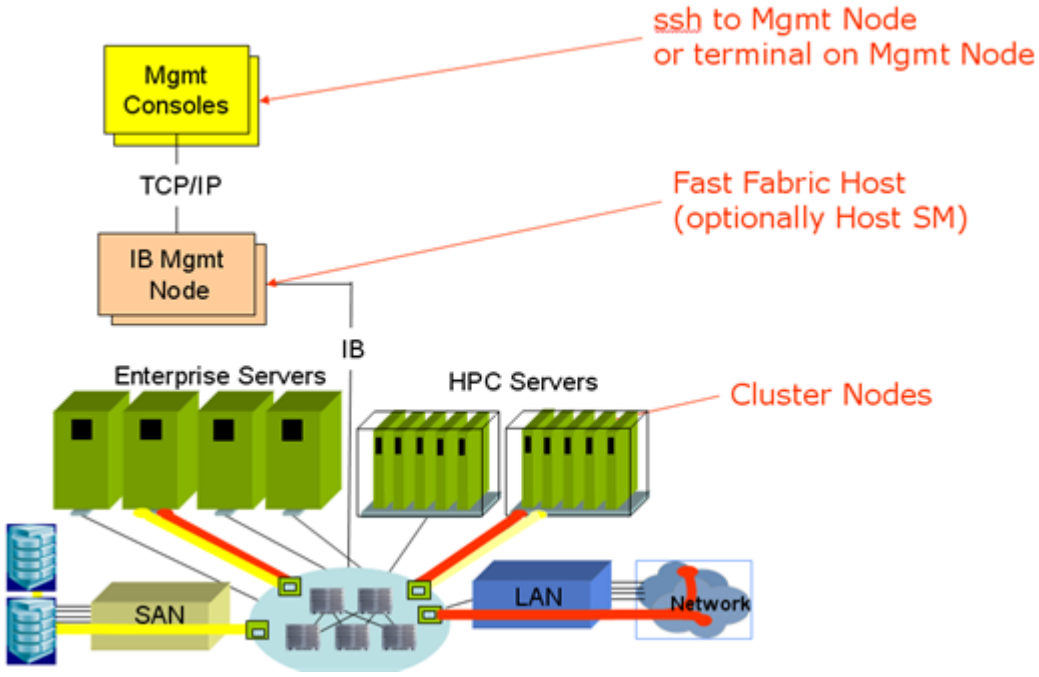

Figure 1-1. FastFabric Architecture

FastFabric is typically installed on one or more InfiniBand Management Nodes. The InfiniBand Management Node must be connected to the rest of the cluster through InfiniBand and a management network. The management network may be the primary InfiniBand network (IPoIB) or Ethernet. The management network will be used for FastFabric host setup and administration tasks. It may also be used for other aspects of server administration or operation.

Depending on cluster size and design, the InfiniBand Management node may also be used as the master node for starting Message Passing Interface (MPI) jobs. It may also be used to run a QLogic Host Fabric Manager (including the Subnet Manager) and other management software. Consult the *QLogic Fabric Manager User Guide* for details and what combinations are valid.

NOTE:

When InfiniBand is used as the management network, FastFabric will not be able to install host InfiniBand software or configure IPoIB. However in this configuration, FastFabric is able to support host InfiniBand software upgrades, verification and all its other features.

If remote access to FastFabric is desired, set up remote access to the InfiniBand Management Node using ssh, telnet, X-Windows, VNC or any other mechanism which will allow the remote user to access a Linux Command Line shell. Typically FastFabric is used only by cluster administrators.

How FastFabric Works

FastFabric consists of a variety of tools to administer hosts, chassis and externally managed switches. Depending on the tool, the method of accessing and administering the target devices may differ.

The following methods are used by FastFabric:

Table 1-1. FastFabric Methods

Method	Examples
Inband access through InfiniBand	Fabric Performance, Error and congestion monitoring. Fabric topology reports, SA database queries, fabric error and link speed analysis, tools for externally managed switches, etc.
Login through a management network	Host setup and installation, tools for internally managed chassis, etc.
MPI job startup (can be inband or through a management network)	Verify MPI performance, running sample MPI benchmarks.

Tools which log in to other hosts will do so in a password-less manner using ssh or telnet (configurable). Tools which log in to internally managed chassis can use ssh or telnet (configurable). Chassis tools can prompt for a single password for all chassis, use password-less ssh, or can be preconfigured with the password. These approaches permit the tools to operate with minimal user interaction and for this reason reduce the time to perform operations against many hosts or chassis.

After initial installation, FastFabric can be configured to use IPoIB instead of the management network.

NOTE:

IPoIB can not be used to reconfigure IPoIB or install new InfiniBand hosts.

2 FastFabric TUI Menu

FastFabric TUI Menu Overview

FastFabric is easiest to use from the textual user interface (TUI) menu system. The menu system provides a way to perform all common tasks and presents common options. Additional less common options are available directly, using the Command Line Tools, documented in the *QLogic FastFabric Command Line Interface Reference Guide*.

In the sections that follow, the menu system will be discussed. The majority of menu items directly invoke various FastFabric command tools. As such the section on each menu item will indicate what command tool it invokes and a summary of the operation performed. For further details about the given command tool, consult the relevant section in the *FastFabric Command Line Interface Reference Guide*.

Some of the menu items are only applicable when Linux is being used. They will be marked with **(Linux)**. Similarly some of the menu items are only applicable when QLogic OFED+, the QLogicIB packaging of OFED software, is being used on the hosts and will be marked with **(Host)**. All menu items which are applicable only when QLogic InfiniBand Switches or Chassis are being used will be marked with **(Switch)**. All remaining menu items are generally applicable to all environments and will be marked with **(All)**

NOTE:

Some of the Linux menu items may be applicable to other Unix-like operating systems.These may be used to enable the use of non-InfiniBand specific FastFabric tools (such as `cmdall`) against the given hosts.

TUI Menu Usage

The TUI menus are set up for ease of use. The submenus typically present operations in the typical order they would be used during an installation. Pressing the keys corresponding to menu items (0-9, a-d) will toggle the `Skip`/`Perform` selection for the given item. More than one item may be selected. Once the desired set of items have been selected, enter **P**. To unselect all items, enter **N**. Entering **X** or pressing **ESC** will exit this menu and return to the Main Menu.

If more than one item is selected, the items will be performed in the order shown in the menu. This is the typical order desired during fabric setup. If it's desired to perform items in a different order, select a single item and enter **P** to perform it by itself. Then repeat for the next item to be performed. An opportunity will be presented after each item is selected to abort as follows:

```
Hit any key to continue (or ESC to abort)...
```

If **ESC** is pressed, the sequence of operations will be aborted and return to the previous menu. Any other key will result in the next selected menu item being performed. This prompt is also shown after the last selected item completes permitting an opportunity to review the results before the screen is cleared to display the menu.

At the top of each FastFabric menu, the file listing the components to operate on is shown. For example:

```
Host List: /etc/sysconfig/iba/hosts
```

On each FastFabric menu, item 0 will permit a different file to be selected and will permit the editing of the file (using the editor selected by the EDITOR environment variable). In addition it will also permit review and editing of the fastfabric.conf file. The fastfabric.conf file guides the overall configuration of FastFabric and describes cluster specific attributes of how FastFabric will operate. It is discussed in greater detail in Appendix A.

During the execution of each menu selection, the actual FastFabric command line tool being used will be shown. This can be used as an educational aid to learn the command line tools.

QLogic InfiniBand Software Main Menu

The QLogic InfiniBand Software main menu is the top level menu for the QLogic InfiniBand Software. It can be activated using the `iba_config` command. This menu is not part of the FastFabric TUI. However, since it is one way of getting to the FastFabric Main Menu it will be summarized here. Figure 2-2 is a example of the QLogic Infiniband Software main menu.

```
QLogic Inc. InfiniBand VERSION Software

    1) Show Installed Software
    2) Reconfigure OFED IP over IB
    3) Reconfigure Driver Autostart
    4) Update HCA Firmware
    5) Generate Supporting Information for Problem Report
    6) Fast Fabric (Host/Chassis/Switch Setup/Admin)
    7) Uninstall Software

    X) Exit
```

Figure 2-2. QLogic InfiniBand Software Main Menu (Example)

Menu Items Description

Selecting items **1** through **7** will display the given submenu. Selecting $\overline{X}$ will exit the menu system. The submenus are described below.

Show Installed Software

Menu item **1) Show Installed Software** when selected displays the **QLogic Inc. IB Installed Software** list and shows what is **Installed** and **Not Installed**.

Reconfigure OFED IP over IB

Menu item **2) Reconfigure OFED IP over IB** when selected proceeds through the reconfiguration of the OFED IP over IB configuration.

Reconfigure Driver Autostart

Menu item **3) Reconfigure Driver Autostart** when selected proceeds through the reconfiguring of the drivers autostart configuration.

Update HCA Firmware

Menu item **4) Update HCA Firmware** when selected proceeds through the updating the HCA Firmware.

Generate Supporting Information for Problem Report

Menu item **5) Generate Supporting Information for Problem Report** when selected proceeds through the process of generating a report and saving it to a user specified file.

Fast Fabric (Host/Chassis/Switch Setup/Admin)

Menu item **6) Fast Fabric (Host/Chassis/Switch Setup/Admin)** when selected displays the **Fast Fabric InfiniBand Tools** menu. Refer to FastFabric Main Menu section below.

Uninstall Software

Menu item **7) Uninstall Software** when selected proceeds to the **QLogic Inc. IB Uninstall Menu**.

FastFabric Main Menu

The FastFabric main menu is the starting point to manage the fabric using the TUI. Selecting **6** from the above menu or executing the `fastfabric` command at a prompt, displays the **Fast Fabric InfiniBand Tools** menu (Figure 2-3)

```
QLogic Inc. Fast Fabric InfiniBand Tools
Version: VERSION

   1) Chassis Setup/Admin
   2) Externally Managed Switch Setup/Admin
   3) Host Setup
   4) Host Verification/Admin
   5) Fabric Monitoring

   X) Exit
```

Figure 2-3. QLogic Fast Fabric InfiniBand Tools Menu (Example)

Menu Items Description

Selecting items **1** through **5** will display the given submenu. Selecting **X** will exit the menu system. The submenus are described below.

Chassis Setup/Admin

Menu item **1) Chassis Setup/Admin** when selected displays the **Fast Fabric IB Chassis Setup/Admin Menu**. Refer to "Fast Fabric IB Chassis Setup/Admin Menu" on page 2-6 for detailed information.

Externally Managed Switch Setup/Admin

Menu item **2) Externally Managed Switch Setup/Admin** when selected displays the **Fast Fabric IB Switch Setup/Admin Menu**. Refer to "Fast Fabric InfiniBand Externally Managed Switch Setup/Admin Menu" on page 2-13 for detailed information.

Host Setup

Menu item **3) Host Setup** when selected displays the **Fast Fabric IB Host Setup Menu**. Refer to "Fast Fabric IB Host Setup" on page 2-19 for detailed information.

Host Verification/Admin

Menu item **4) Host Verification/Admin** when selected displays the **Fast Fabric IB Host Verification/Admin Menu**. Refer to "Fast Fabric IB Host Verification/Admin Menu" on page 2-23 for detailed information.

Fabric Monitoring

Menu item **5) Fabric Monitoring** when selected displays the **Fast Fabric IB Fabric Monitoring Menu**. Refer to "Fabric Monitoring" on page 2-29 for detailed information.

Fast Fabric IB Chassis Setup/Admin Menu

This menu is focused on initial setup and administration of QLogic 12000 internally-managed InfiniBand switches. Pressing the keys corresponding to menu items (0-9) will toggle the **Skip/Perform** selection for the given item. More than one item may be selected. Once the desired set of items have been selected, enter **P**. To unselect all items, enter **N**. Entering **X** or pressing **ESC** will exit this menu and return to the Main Menu.

Selecting **1** from the **Fast Fabric InfiniBand Tools** menu (Figure 2-3), displays the **Fast Fabric IB Chassis Setup/Admin Menu** (Figure 2-4)

```
Fast Fabric IB Chassis Setup/Admin Menu
Chassis List: /etc/sysconfig/iba/chassis

Setup:
0) Edit Config and Select/Edit Chassis Files [ Skip  ]
1) Verify Chassis via Ethernet ping          [ Skip  ]
2) Update Chassis Firmware                   [ Skip  ]
3) Setup Chassis Basic Configuration         [ Skip  ]
4) Setup Password-less ssh/scp               [ Skip  ]
5) Reboot Chassis                            [ Skip  ]
6) Configure Chassis Fabric Manager          [ Skip  ]
7) Get Basic Chassis Configuration           [ Skip  ]
Admin:
8) Check Status of IB Ports                  [ Skip  ]
9) Control Chassis Fabric Manager            [ Skip  ]
a) Generate all Chassis Problem Report Info  [ Skip  ]
b) Run a command on all chassis              [ Skip  ]
Review:
c) View iba_chassis_admin result files       [ Skip  ]

P) Perform the selected actions              N) Select None
X) Return to Previous Menu (or ESC)
```

Figure 2-4. Fast Fabric IB Chassis Setup/Admin Menu

Menu Items Description

Selecting items **0** through **c** will change the item from **skip** to **perform**. Selecting **N** will unselect all items and **X** will exit the menu system. The items are described below.

Edit the Configuration and Select/Edit Chassis Files

(Switch) This will permit the `chassis, ports` and `fastfabric.conf` files to be edited. The chassis file selected and created by the menu should list the internally managed QLogic switching chassis which are to be operated on. After editing the files, an opportunity is given to edit them again or continue forward. The first file to review and edit is the FastFabric configuration file, `/etc/sysconfig/fastfabric.conf`:

```
About to: vi /etc/sysconfig/fastfabric.conf
Hit any key to continue (or ESC to abort)...
```

The next file to be reviewed is the FastFabric `PORTS_FILE`, `/etc/sysconfig/iba/ports`:

```
About to: vi /etc/sysconfig/iba/ports
Hit any key to continue (or ESC to abort)...
```

The next file to be reviewed is the chassis file, It first ask the user to select the chassis file to use and gives a default. If a different chassis file needs to be edited the user would need to type in the file location and name. If not pressing ENTER selects the default chassis file:

```
Select Chassis File to Use/Edit [/etc/sysconfig/iba/chassis]:
About to: vi /etc/sysconfig/iba/chassis
Hit any key to continue (or ESC to abort)...
```

After exiting the vi editor, the TUI will ask if you want to edit the chassis file again. Answer `n` to continue forward and return to the **Fast Fabric IB Chassis Setup/Admin Menu**.

Refer to “FastFabric Configuration File” on page A-2 for more details about the format of the FastFabric configuration file. Refer to “Port List File” on page A-17 for more details about the format of the FastFabric ports file. Refer to “Chassis List Files” on page A-12 for more details about the format of the chassis list file and about the iba_gen_chassis command which can help generate the chassis file.

Verify Chassis via Ethernet ping

(Switch) This will run the `pingall -C -p -F` command to verify the existence of each selected chassis listed in the `chassis` file using a ping over the management network.

Update Chassis Firmware

(Switch) This will run the `iba_chassis_admin update` command to permit the chassis firmware version to be verified and updated as needed.

NOTE:

Any QLogic or SilverStorm 9000 chassis must be running firmware version 4.0.0.4.3 or later to perform this function. If the chassis is not up to this level, it will need to be manually updated using the chassis GUI. See the *SilverStorm 9000 Users Guide* for more information.

NOTE:

Consult the relevant chassis firmware release notes to ensure any prerequisites for the upgrade to the new firmware level have been met prior to performing the upgrade using FastFabric.

Prompts will guide the user through the options:

- **`run`** - Ensures given firmware is in primary image and running. As needed push firmware to each chassis, select it for use and/or if its not the presently running firmware, reboot the chassis
- **`select`** - Ensures given firmware is in primary image. As needed push firmware to each chassis and/or select it for use on next reboot
- **`push`** - Ensures given firmware is in primary or alternate image. As needed push firmware to each chassis but do not change selected nor running firmware

Additional options prompted for:

- selection of firmware files or directory containing `.pkg` files
- parallel vs serial update
- prompting for chassis password (default is to have password in `fastfabric.conf` or to use password-less ssh)

If any chassis fails to be updated, use the **View iba_chassis_admin result files** option to review the result files from the update. Refer to *FastFabric Command Line Interface Reference Guide* for more details.

Set up Chassis Basic Configuration

(Switch) This will run the `iba_chassis_admin configure` command which will prompt for chassis configuration settings and then configure all the selected chassis accordingly. The following aspects of chassis configuration may be set:

- Syslog Server IP Address, and Facility code

- NTP Server IP Address
- Time zone and Daylight Savings Time (DST)
- Maximum MTU size, VL Capability and Link Layer Credit Distribution
- Link Width Supported
- IB Node Description (configured to match chassis ethernet name)

  The IB node description must be a string consisting of the characters A–Z, a–z,0–9, and underscore. No spaces are allowed in the node description string, and it may not begin with a digit.,
- IB Node Description format (concise format or verbose format)
- Disable chassis auto clear of port counters

NOTE:

It is required to set the chassis IP address using the chassis serial port CLI during initial chassis installation and setup.

Setup Password-less SSH/SCP

(Switch) This will run the `setup_ssh -C` command. This will set up secure password-less SSH such that the InfiniBand Management Node can securely login to all the other chassis as admin through the management network without requiring a password.

Password-less SSH avoids the need to enter the chassis password for each FastFabric chassis operation. It also avoids the need to put the chassis password in `/etc/sysconfig/fastfabric.conf`. Once password-less ssh is set up, the password in the chassis may be changed without impacting the ability to use password-less ssh.

As part of this operation, the user will be prompted:

```
Would you like to override the default Chassis password? [n]:
```

If `y` is answered, the user will be prompted for the current password to use to login into each chassis. Otherwise the password specified in `/etc/sysconfig/fastfabric.conf` will be used.

Reboot Chassis

(Switch) This will run the `iba_chassis_admin` reboot command to reboot each chassis listed in the `/etc/sysconfig/iba/chassis` file that was created in an earlier step. it also ensures that they are rebooted (as verified using ping over the management network).

Configure Chassis Fabric Manager

(Switch) The **Configure Chassis Fabric Manager** selection will assist in configuring the Fabric Manager for any QLogic 12000 chassis with appropriate license keys. This operation will be skipped for other chassis models.

Prompts will first guide the user through selection or generation of a `qlogic_fm.xml` file. When `generate` is selected, the `config_generate` command is used to guide the user through selecting Fabric Manager configuration options. See the *QLogic Fabric Manager User Guide* for more information about `config_generate`.

Prompts will guide the user through selecting the config update options:

- **`run`** - Ensures given Fabric Manager configuration is on the chassis and running. As needed push Fabric Manager configuration to each chassis. It will unconditionally restart the Fabric Manager on master Management Modules (MM), it will make sure it is not running on slave MMs.
- **`runall`** - Ensures given Fabric Manager configuration is on the chassis and running. As needed push Fabric Manager configuration to each chassis. It will unconditionally restart the FM on master and slave MMs
- **`push`** - Ensures given Fabric Manager configuration is on the chassis. As needed push Fabric Manager configuration to each chassis.

Prompts will also guide the user through selecting the Fabric Manager autostart options:

- **`enable`** - Enables Fabric Manager start on master MM upon chassis boot/reboot, disabled Fabric Manager autostart on any slave MMs in selected chassis.
- **`enableall`** - Enables Fabric Manager start on master and any slave MMs in selected chassis upon boot/reboot.
- **`disable`** - Disables Fabric Manager start on master and any slave MMs in selected chassis upon boot/reboot.

Additional options prompted for:

- parallel vs serial update
- prompting for chassis password (default is to have password in `fastfabric.conf` or to use password-less ssh)

If any chassis fails to be updated, use the **View iba_chassis_admin result files** option to review the result files from the update. Refer to *FastFabric Command Line Interface Reference Guide* for more details.

Get Basic Chassis Configuration

(Switch) The **Get Basic Chassis Configuration** supports a new feature to retrieve basic information from chassis such as syslog, NTP configuration, time zone information, MTU Capability, VL Capability, VL Credit Distribution, Link Width and node description. The following is an example of the information retrieved:

```
TEST SUITE getconfig CASE (getconfig.i12k71f.getconfig) get i12k71f
i12k71f:
    Syslog Configuration   : Syslog host set to: 192.168.2.15 port 514
facility 22
    NTP                    : Configured to use NTP server: 10.32.2.3
    time zone              : Current time zone offset is: -5
    MTU Capability         : 2048 Bytes
    VL Capability          : 2 VLs
    VL Credit Distribution : 4
    LinkWidth Support      : 4X
    Node Description       : i12k71f
    Auto clear status      : Auto clear is disabled

PASSED
```

Check Status of IB Ports

(Switch or All): **Check Status of IB Ports** allows the state and error counts of all ports to be checked and reviewed.

Based on the answers to the prompts shown below either the `showallports -C` or the `iba_report` command will be used.

```
Would you like to perform fabric error analysis? [y]:
Clear error counters after generating report? [y]:
Would you like to perform fabric link speed error analysis?
[y]:
Check for links configured to run slower than supported? [n]:
Check for links connected with mismatched speed potential?
[n]:
```

(All): The answer to `Would you like to perform fabric error analysis` selects whether `iba_report -o` errors should be run. If the user answers `y`, the `Clear error counters after processing report` question is asked. If the user answers `y`, the `-C` option will also be used on `iba_report` to clear the port error counters after doing the error analysis.

(All): The answer to `Would you like to perform fabric link speed error analysis` indicates whether `iba_report -o slowlinks` should be run. If the user answers `y` to this question, the `Check for links configured to run slower than supported` question is asked. If the user answers `y`, the `-o misconfiglinks` option will also be used for `iba_report`. Additionally, if the user answers `y` to the `Would you like to perform fabric link speed error analysis` question, the `Check for links connected with mismatched speed potential` question will also be asked. If the user answers `y`, the `-o misconnlinks` option is also be used for `iba_report`.

Answering `y` to all but the last 2 questions is recommended (these are the defaults for each prompt). This checks all the ports in the fabric for any links that have high error rates or are running at a lower speed than expected. Any identified links should be diagnosed and corrected.

NOTE:

If the fabric is homogeneous and all links are expected to be running at full speed, answer `y` to the last two questions as well.

(Switch): If the user responds `n` to all of the prompts, the `showallports -C` command is run to allow the state and symbol error counts of all chassis ports to be manually reviewed.

Control Chassis Fabric Manager

(Switch) The **Configure Chassis Fabric Manager** selection will assist in controlling the Fabric Manager for any QLogic 12000 chassis with appropriate license keys. This operation will be skipped for other chassis models.

Prompts will guide the user through selecting the control options:

- **restart** - Unconditionally restart the Fabric Manager on master Management Modules (MM), it will make sure it is not running on slave MMs.
- **restartall** - Unconditionally restart the FM on master and slave MMs
- **run** - make sure FM is running on master Management Modules (MM), it will make sure it is not running on slave MMs.
- **runall** - make sure FM is running on master and slave MMs
- **stop** - Stop FM on master and slave MMs.

Prompts will also guide the user through selecting the Fabric Manager autostart options:

- **enable** - Enables Fabric Manager start on master MM upon chassis boot/reboot, disabled Fabric Manager autostart on any slave MMs in selected chassis.

- **enableall** - Enables Fabric Manager start on master and any slave MMs in selected chassis upon boot/reboot.
- **disable** - Disables Fabric Manager start on master and any slave MMs in selected chassis upon boot/reboot.

Additional options prompted for:

- parallel vs serial operation
- prompting for chassis password (default is to have password in `fastfabric.conf` or to use password-less ssh)

If any chassis fails the operation, use the **View iba_chassis_admin result files** option to review the result files from the update. Refer to QLogic *FastFabric Command Line Interface Reference Guide* for more details.

Generate all Chassis Problem Report Information

(Switch) This will run the `captureall -C` command to collect configuration and status information from all selected chassis and generate a single `*.tgz` file that can be sent to the Support Representative.

Run a command on all chassis

(Switch) This will run the `cmdall -C` command. A Chassis CLI command may be specified to be executed against all selected chassis.

View iba_chassis_admin results files

(All) This permits viewing of the `test.log` and `test.res` files which reflect the results from `iba_chassis_admin` runs (such as for updating Chassis Firmware or rebooting all chassis per menu items above). The user is also given the option to remove these files after viewing them.

If not removed, subsequent runs of `iba_chassis_admin`, `iba_host_admin` or `iba_switch_admin` from within the current directory will continue to append to these files.

Fast Fabric InfiniBand Externally Managed Switch Setup/Admin Menu

This menu is focused on administration of QLogic 12200 and SilverStorm 9024FC externally managed switches. Pressing the keys corresponding to menu items (0-8) will toggle the **Skip/Perform** selection for the given item. More than one item may be selected. Once the desired set of items have been selected, enter **P**. To unselect all items, enter **N**. Entering **X** or pressing **ESC** will exit this menu and return to the Main Menu.

Selecting **2** from the **Fast Fabric InfiniBand Tools** menu (Figure 2-3), displays the **Fast Fabric IB Externally Managed Switch Setup/Admin Menu** (Figure 2-5)

```
Fast Fabric IB Switch Setup/Admin Menu
Externally Managed Switch List: /etc/sysconfig/iba/ibnodes

Setup:
0) Edit Config and Select/Edit Switch Files  [ Skip  ]
1) Test for Switch Presence                  [ Skip  ]
2) Verify Switch Firmware                    [ Skip  ]
3) Update Switch Firmware                    [ Skip  ]
4) Setup Switch Basic Configuration          [ Skip  ]
5) Reboot Switch                             [ Skip  ]
6) Report Switch Firmware & Hardware Info    [ Skip  ]
7) Get Basic Switch configuration            [ Skip  ]
Admin:
8) Report Switch VPD Information             [ Skip  ]
9) Generate all Switch Problem Report Info   [ Skip  ]
Review:
a) View iba_switch_admin result files        [ Skip  ]

P) Perform the selected actions              N) Select None
X) Return to Previous Menu (or ESC)
```

Figure 2-5. Fast Fabric IB Switch Setup/Admin Menu

Menu Items Description

Selecting items **0** through **9** or **a** will change the item from **skip** to **perform**. Selecting **N** will unselect all items and **X** will exit the menu system. The items are described below.

Edit Config and Select/Edit Switch Files

(Switch) This will permit the `fastfabric.conf`, `ports`, and `ibnodes` files to be edited. The `fastfabric.conf` file controls the default operation of the FastFabric Tools. The values specified in the `fastfabric.conf` specify the defaults that will be used for all FastFabric operations performed using this o access the fabric(s) being used. Existing environment variables will override the values in this `ports` file. The `ibnodes` file selected and created using this menu should list Externally Managed 12000 and 9024FC Switches that are to be used. After editing the three files, an opportunity is given to edit them again or continue forward.

```
Do you want to edit/review/change the files? [y]:
```

The default will repeat the editing process, answer `n` to continue forward.

Refer to *FastFabric Command Line Interface Reference Guide* for more details about the format of the `ibnodes` and `ports` file, and about the `iba_gen_ibnodes` command which can help generate the ibnodes file.

Test for Switch Presence

(Switch) This will run the `iba_switch_admin ping` command to test for the presence of the selected switches in the fabric.

Verify Switch Firmware

(Switch) This will run the `iba_switch_admin fwverify` command to verify the integrity of the present firmware in the switch. If this operation fails, prior to any switch reboots or power-offs of the switch, perform **Update Switch Firmware** to correct the firmware in the switch**.**

Update Switch Firmware

(Switch) This will run the `iba_switch_admin upgrade` command to permit the switch firmware version to be updated and the switch node name to be set.

NOTE:

Consult the relevant switch firmware release notes to ensure any prerequisites for the upgrade to the new firmware level have been met prior to performing the upgrade using FastFabric.

Prompts will guide the user through options:

- Selection of firmware files or directory containing `.emfw` files
- Reboot switch after update (needed to run new firmware)
- Parallel vs serial update
- Prompting for switch password

NOTE:

Since the InfiniBand fabric itself is used to update externally managed switches, updating multiple switches with the reboot option may disrupt parallel update operations. If there are no selected externally managed switches in the path from the InfiniBand Management Node to any other externally managed switch, parallel operations may be used. For example if an InfiniBand Management node is connected directly to a core switch and the externally managed switches are only at the edges. If in doubt, do not use parallel update. Be aware that non-parallel operation for a fabric with many externally managed switches could take a significant amount of time. Another alternative is to perform the update in parallel without a reboot and then perform the reboot separately using the **Reboot Switch** menu selection. To control the order of the rebooting of externally managed switches by FastFabric, see the discussion of the **distance** value in "Externally Managed Switch List File" on page A-13.

If any switches fail to be updated, use the **View iba_switch_admin result files** option to review the result files from the update. Refer to *FastFabric Command Line Interface Reference Guide* for more details.

Setup Switch Basic Configuration

(Switch) This will run the `iba_switch_admin configure` command which will prompt for switch configuration settings and then configure all the selected QLogic 12200 switches accordingly. The following aspects of switch configuration may be set:

- Maximum MTU size
- VL Capability
- Link Layer Credit Distribution
- Link Width Supported
- Link Speed Supported
- IB Node Description

NOTE:

Normally, the IB Node Description is updated as part of a firmware upgrade; however, the user is given the option to update the node description outside of an upgrade procedure.

NOTE:

This only operates on QLogic 12200 switches. Any 9024FC switches selected will be skipped without change.

Reboot Switch

(Switch) This will run the `iba_switch_admin reboot` command to reboot all the switches listed in the `/etc/sysconfig/iba/ibnodes` file that was created in a previous step.

Report Switch Firmware & Hardware Info

(Switch) This will run the `iba_switch_admin info` command to provide a summary of the present state for all the selected switches.

The information reported by this option includes:

- Firmware Version
- Hardware Version
- Hardware Part Number
- Switch Capability (SDR, DDR, or QDR)
- Present Fan Status
- Present status of both power supplies (in some models the second power supply is optional)

If information fails to be reported for any switches, use the **View iba_switch_admin result files** option to review the result files from the update. Refer to *FastFabric Command Line Interface Reference Guide* for more details.

Get Basic Switch configuration

(Switch) This will run the `iba_switch_admin -S -L /etc/sysconfig/iba/ibnodes getconfig` command to retrieve basic information from externally managed switch such as: MTU, VL Cap, Credit Distribution, Link Width, Link Speed and node description.

The following files are produced from this selection:

- test.res - appended with summary results of run
- test.log - appended with detailed results of run
- save_tmp/ - contains a directory per failed operation with detailed logs
- test_tmp*/ - intermediate result files while operation is running

Report Switch VPD Information

(Switch) This will run the `iba_switch_admin hwvpd` command to provide the Virtual Product Data (VPD) for all the selected switches. This information can be useful for inventory and asset control as well as to provide details about the product to customer support.

The information reported by this option includes:

- Serial Number
- Part Number
- Model Number
- Hardware Version
- Manufacturer
- Product description
- Manufacturer ID code
- Manufacture date
- Manufacture time of day

If information fails to be reported for any switches, use the **View iba_switch_admin result files** option to review the result files from the update. Refer to *FastFabric Command Line Interface Reference Guide* for more details.

Generate All Switch Problem Report Info

(Switch) This menu item runs the `captureall -n -S -p` command to collect configuration and status information from all selected switches, then generates a single `*.tgz` file that can be sent to Technical Support.

View iba_switch_admin result files

(All) This permits viewing of the `test.log` and `test.res` files that reflect the results from `iba_switch_admin` runs (such as those for updating Switch Firmware or rebooting all switches per menu items above). The user is also given the option to remove these files after viewing them.

If not removed, subsequent runs of `iba_chassis_admin`, `iba_host_admin` or `iba_switch_admin` from within the current directory will continue to append to these files.

Fast Fabric IB Host Setup

This menu is focused on initial host setup and installation of InfiniBand software on all the hosts. Pressing the keys corresponding to menu items (0-9, a-d) will toggle the **Skip/Perform** selection for the given item. More than one item may be selected. Once the desired set of items have been selected, enter **P**. To unselect all items, enter **N**. Entering **X** or pressing **ESC** will exit this menu and return to the Main Menu.

Selecting **3** from the **Fast Fabric InfiniBand Tools** menu (Figure 2-3), displays the **Fast Fabric IB Host Setup Menu** (Figure 2-6)

```
Fast Fabric IB Host Setup Menu
Host List: /etc/sysconfig/iba/hosts

Setup:
0) Edit Config and Select/Edit Hosts Files   [ Skip  ]
1) Verify Hosts via Ethernet ping            [ Skip  ]
2) Setup Password-less ssh/scp               [ Skip  ]
3) Copy /etc/hosts to all hosts              [ Skip  ]
4) Show uname -a for all hosts               [ Skip  ]
5) Install/Upgrade QLogic IB Software        [ Skip  ]
6) Configure IPoIB IP Address                [ Skip  ]
7) Build MPI Test Apps and Copy to Hosts     [ Skip  ]
8) Reboot Hosts                              [ Skip  ]
Admin:
9) Refresh ssh Known Hosts                   [ Skip  ]
a) Rebuild MPI Library and Tools             [ Skip  ]
b) Run a command on all hosts                [ Skip  ]
c) Copy a file to all hosts                  [ Skip  ]
Review:
d) View iba_host_admin result files          [ Skip  ]

P) Perform the selected actions              N) Select None
X) Return to Previous Menu (or ESC)
```

Figure 2-6. Fast Fabric IB Host Setup Menu

Menu Items Description

Selecting items **0** through **9** and **a** through **d** will change the item from skip to perform. Selecting **N** will unselect all items and **X** will exit the menu system. The items are described below.

Edit Configuration and Select/Edit Hosts Files

(All) This will permit the hosts and `fastfabric.conf` files to be edited. The hosts file selected and created using this menu should not list the FastFabric host itself. After editing the two files, an opportunity is given to edit them again or continue forward.

```
Selected Host File: /etc/sysconfig/iba/hosts
Do you want to edit/review/change the files? [y]:
```

The default will repeat the editing process, answer `n` to continue forward.

Refer to *FastFabric Command Line Interface Reference Guide* for more details about the format of the hosts file.

Verify Hosts via Ethernet ping

(All) This will run the `pingall` command. All the hosts listed will be pinged through the Management Network.

Setup Password-less SSH/SCP

(Linux) This will run the `setup_ssh -s -S -i ""` command. This will setup secure password-less SSH such that the InfiniBand Management Node can securely login to all the other hosts as root through the management network without requiring a password. The user will be prompted for the present password of the hosts, the same password will be used to login to all selected hosts. Once password-less ssh is setup, the password in the hosts may be changed without impacting the ability to use password-less ssh.

Password-less SSH is required by FastFabric, MPI test applications and most versions of MPI (including QuickSilver MPI, OFED openmpi, OFED mvapich, and OFED mvapich2).

Copy /etc/hosts to all hosts

(Linux) This will run the `scpall /etc/hosts /etc/hosts` command to copy the `/etc/hosts` file on this host to all the other selected hosts. This is not necessary when using a DNS server to resolve hostnames for the cluster.

Show uname -a for all hosts

(Linux) This run the `cmdall "uname -a"` command to show the OS version on all the hosts. Review the results carefully to verify all the hosts have the expected OS version. In typical clusters all hosts will be running the same OS and kernel version.

Install/Upgrade QLogic IB Software

(Host) This will run the `iba_host_admin load` or `iba_host_admin update` command to install the QLogicIB software on all the hosts. By default it will look in the current directory for the *`FF_PRODUCT`*`.`*`FF_PRODUCT_VERSION`*`.tgz` file. If it is not found in the current directory, it will prompt for input of a directory name where this file can be found.

Prompts will guide the user through options:

- **`upgrade`** - updates all servers with new release. Only components previously installed are upgraded. Will fail for any hosts which have no QLogicIB software currently installed
- **`initial install/load`** - uninstalls any existing QLogicIB software and installs the given release based on `fastfabric.conf` installation options specified.

After the install is completed, the hosts will still need to be rebooted to bring up the new InfiniBand drivers. This can be performed using Reboot Hosts option.

If any hosts fail to be updated, use the View iba_host_admin result files option to review the result files from the update. For more details, see *FastFabric Command Line Interface Reference Guide*.

NOTE:

When using the QLogicIB packaging of OFED, the entire InfiniBand stack may be installed using FastFabric, which is the recommended approach. When using other packagings of OFED, FastFabric may be used to install the QLogicIB Tools (`InfiniServTools.`*`FF_PRODUCT_VERSION`*`.tgz`) on the remaining hosts. To do so, *`FF_PRODUCT_VERSION`* must be set to the desired InfiniServTools release level and OFED must be installed on each host manually.

NOTE:

The InfiniBand software selected for installation must be appropriate for the OS version and distribution installed on the destination hosts.

Configure IPoIB IP Address

(Host) This will run the `iba_host_admin configipoib` command to create the `ifcfg-ib0` files on each host. The file will be created with a statically assigned IPv4 address. The IPoIB IP address for each host will be determined by the resolver (Linux host command). If not found using the resolver, `/etc/hosts` on the given host will be checked.

Build MPI Test Apps and Copy to Hosts

(Host) This will build the MPI sample benchmarks on the InfiniBand Management Node and copy the resulting object files to all the hosts. This is in preparation for execution of MPI performance tests and benchmarks in a later step.

NOTE:

This option is available for the QLogicIB packaging of OFED, but is not presently available for other packagings of OFED.

Reboot Hosts

(Linux) This will run the `iba_host_admin reboot` command to reboot all the selected hosts and ensure they go down and come back up (as verified using ping over the management network). When the hosts come back up, they will be running the InfiniBand software installed.

Refresh SSH Known Hosts

(Linux) This will run the `setup_ssh -U ""` command to refresh the ssh known hosts list on this server for the Management Network. This may be used to update security for this host if hosts are replaced, reinstalled, renamed, or repaired.

Rebuild MPI Library and Tools

(Host) This will rebuild the MPI Library itself and related tools (such as mpirun). This will be performed using the `do_build` tool supplied with the MPI Source. When rebuilding MPI, `do_build` will prompt the user for selection of which MPI (openmpi, mvapich or mvapich2) to rebuild and provide choices as to which available compiler to use. Consult the *QLogic HCA and QLogic OFED Software Users Guide* for more information.

NOTE:

This option is available for the QLogicIB packaging of OFED, but is not presently available for other packagings of OFED.

Run a command on all hosts

(Linux) This will run the `cmdall` command. A Linux shell command (or sequence of commands separated by semicolons) may be specified to be executed against all selected hosts.

Copy a file to all hosts

(Linux) This will run the `scpall` command. A file on the local host may be specified to be copied to all selected hosts.

View iba_host_admin result files

(All) This permits viewing of the `test.log` and `test.res` files that reflect the results from `iba_host_admin` runs (such as for installing InfiniBand software or rebooting all hosts per menu items above). The user is also given the option to remove these files after viewing them.

If not removed, subsequent runs of `iba_chassis_admin`, `iba_host_admin` or `iba_switch_admin` from within the current directory will continue to append to these files.

Fast Fabric IB Host Verification/Admin Menu

This menu is focused on verifying hosts and the fabric as well as administration of all the hosts. Pressing the keys corresponding to menu items (0-9, a-b) will toggle the **Skip/Perform** selection for the given item. More than one item may be selected. Once the desired set of items have been selected, enter **P**. To unselect all items, enter **N**. Entering **X** or pressing **ESC** will exit this menu and return to the Main Menu.

Selecting **4** from the **Fast Fabric InfiniBand Tools** menu (Figure 2-3), displays the **Fast Fabric IB Host Verification/Admin Menu** (Figure 2-7)

```
Fast Fabric IB Host Verification/Admin Menu
Host List: /etc/sysconfig/iba/allhosts

Validation:
0) Edit Config and Select/Edit Hosts Files   [ Skip  ]
1) Verify Hosts via Ethernet ping            [ Skip  ]
2) Summary of Fabric Components              [ Skip  ]
3) Check Status of IB Ports                  [ Skip  ]
4) Verify Hosts see each other               [ Skip  ]
5) Verify Hosts ping via IPoIB               [ Skip  ]
6) Refresh ssh Known Hosts                   [ Skip  ]
7) Check MPI Performance                     [ Skip  ]
8) Check Overall Fabric Health               [ Skip  ]
Admin:
9) Generate all Hosts Problem Report Info    [ Skip  ]
a) Run a command on all hosts                [ Skip  ]
Review:
b) View iba_host_admin result files          [ Skip  ]

P) Perform the selected actions              N) Select None
X) Return to Previous Menu (or ESC)
```

Figure 2-7. Fast Fabric IB Host Verification/Admin Menu

Menu Items Description

Selecting items **0** through **9** `and` **a** `through` **b** will change the item from **skip** to **perform**. Selecting **N** will unselect all items and **X** will exit the menu system. The items are described below.

Edit Config and Select/Edit Hosts Files

(All) This will permit the `allhosts`, `ports`, and `fastfabric.conf` files to be edited. The `allhosts` file selected and created using this menu should list the FastFabric host itself. After editing the two files, an opportunity is given to edit them again or continue forward.

```
Selected Host File: /etc/sysconfig/iba/allhosts
Do you want to edit/review/change the files? [y]:
```

The default will repeat the editing process, enter `n` to continue forward.

Refer to *FastFabric Command Line Interface Reference Guide* for more details about the format of the `allhosts` and `ports` files.

Verify Hosts via Ethernet ping

(All) This will run the `pingall` command. All the hosts listed will be pinged through the Management Network.

Summary of Fabric Components

(All) This will run the `fabric_info` command to provide a brief summary of the counts of components in the fabric including how many switch chips, hosts, and links are in the fabric. It will also indicate if any 1x links were found (that could indicate a poorly seated or bad cable). Review the results against the expected configuration of the cluster.

NOTE:

The link count includes some internal links within the switch boxes. This means that the count displayed will be greater than the actual number of cables.

Check Status of IB Ports

(Host or All): **Check Status of IB Ports** allows the state and error counts of all ports to be checked and reviewed.

Based on the answers to the prompts shown below either the `showallports` or the `iba_report` command will be used.

```
Would you like to perform fabric error analysis? [y]:
Clear error counters after generating report? [y]:
Would you like to perform fabric link speed error analysis?
[y]:
Check for links configured to run slower than supported? [n]:
Check for links connected with mismatched speed potential?
[n]:
```

(All): The answer to `Would you like to perform fabric error analysis` selects whether `iba_report -o` errors should be run. If the user enters `y`, the `Clear error counters after processing report` question is asked. If the user enters `y`, the `-C` option will also be used on `iba_report` to clear the error counters after doing the error analysis.

(All): The answer to `Would you like to perform fabric link speed error analysis` indicates when `iba_report -o slowlinks` should be run. If the user enters `y` to this question, the `Check for links configured to run slower than supported` question is asked. If the user enters `y`, the `-o misconfiglinks` option will also be used for `iba_report`. Additionally, if the user enters `y` to the `Would you like to perform fabric link speed error analysis` question, the `Check for links connected with mismatched speed potential` question will also be asked. If the user enters `y`, the `-o misconnlinks` option is also be used for `iba_report`.

Entering `y` to all but the last 2 questions is recommended (these are the defaults for each prompt). This checks all the ports in the fabric for any links that have high error rates or are running at a lower speed than expected. Any identified links should be diagnosed and corrected.

NOTE:

If the fabric is homogeneous and all links are expected to be running at full speed, enter `y` to the last two questions as well.

(Host): If the user enters `n` to all of the prompts, the `showallports` command is run to allow the state and symbol error counts of all host ports to be manually reviewed. Selection of this option requires that QLogicIB OFED+ software be installed on all hosts being checked.

Verify Hosts see each other

(Host) This will run the `iba_host_admin sacache` command to verify that each host can see all the others through queries to the Subnet Administrator. For the OFED+ stack this also verifies the Distributed SA on each host has been fully populated.

NOTE:

This operation requires that the hosts being queried be specified by a resolvable TCP/IP host name. This operation will FAIL if the selected hosts are specified by IP address. See the *FastFabric Command Line Interface Reference Guide,* Selection of Hosts section for more information.

Verify Hosts ping via IPoIB

(Host) This will run the `iba_host_admin ipoibping` command to verify that IPoIB is properly configured and running on all the hosts. This is accomplished through the InfiniBand management node pinging each host using IPoIB.

Refresh SSH Known Hosts

(Linux) This will run the `setup_ssh -U` command to refresh the SSH known hosts list on this server for the IPoIB and Management Networks. This may be used to update security for this host if hosts are replaced, reinstalled, renamed, or repaired.

Check MPI Performance

(Host) This will do a quick check of PCI and MPI performance using end to end latency and bandwidth tests.

NOTE:

This option is available for the QLogicIB packaging of OFED, but is not presently available for other packagings of OFED.

Based on the answer to the prompt shown below either the `iba_host_admin mpiperfdeviation` or the `iba_host_admin mpiperf` command will be used.

```
Test Latency and Bandwidth deviation between all hosts? [y]:
```

Answering `y` is recommended, this will run the `iba_host_admin mpiperfdeviation` command to do pairwise analysis of latency and bandwidth for the selected hosts and report pairs outside an acceptable tolerance range. By default performance is compared relative to other hosts in the fabric (with the assumption that all hosts selected for a given run should have comparable InfiniBand performance). Failing hosts will be clearly indicated.

Answering **`n`** will run the `iba_host_admin mpiperf` command. This displays the MPI latency and bandwidth between pairs of hosts (1-2, 3-4, 5-6, etc). The numbers reported should be checked against the practical PCI speeds in the Performance Impact table in the *QLogic Fabric Software Installation Guide*. If any pairs are not in the expected performance range, it should be considered a failure for those pairs of hosts.

For either test, If any hosts fail, carefully examine the failing hosts to verify the HCA models, PCI slot used, BIOS settings and any motherboard jumpers related to devices on PCI buses or slot speeds. Also verify the HCA and riser cards are properly seated.

The results of either test are also written to the `test.res` file which may be viewed using the **View iba_host_admin result files**. Refer to *FastFabric Command Line Interface Reference Guide* for more details.

The bandwidth reported should also be checked against the practical PCI speeds in the Performance Impact section. If all pairs are not in the expected performance range, carefully examine all hosts to verify the HCA models, PCI slot used, BIOS

settings and any motherboard jumpers related to devices on PCI buses or slot speeds.

Check Overall Fabric Health

(Host) This will run the `all_analysis` command to check the overall fabric health.

The user will be prompted:

```
Baseline present configuration? [n]:
```

If the user enters `y`, a new baseline will be created using the present fabric configuration. If the user enters `n`, the present fabric state is checked against the baseline and the general health of the fabric is also checked.

Generate all Hosts Problem Report Info

(Host) This will run the `captureall` command to collect configuration and status information from all hosts and generate a single `*.tgz` file which can be sent to the Support Representative.

Based on the answer to the prompt shown below, various levels of detail about the fabric can be included in the capture.

```
Capture detail level (1=Normal, 2-Fabric, 3-Fabric+FDB,
4-Analysis):
```

The Details levels are:

`1-Normal` - obtains local information from each host

`2-Fabric` - in addition to “Normal”, also obtains basic fabric information by queries to the SM and fabric error analysis using `iba_report`.

`3-Fabric+FDB` - in addition to “Fabric”, also obtains all the switch forwarding tables and InfiniBand multicast membership lists from the SM.

`4-Analysis` - in addition to “Fabric+FDB”, also obtains `all_analysis` results. If `all_analysis` has not yet been run, it is run as part of the capture.

NOTE:

Detail levels 2-4 can be used when fabric operational problems occur. If the problem is most likely node specific, detail level 1 should be sufficient. Detail levels 2-4 require an operational Fabric Manager. Typically your support representative will request a given detail level. If a given detail level takes excessively long or fails to be gathered, try a lower detail level.

For detail levels 2-4, the additional information is only gathered on the node running the captureall command. The information is gathered for every fabric specified in the `/etc/sysconfig/iba/ports file`.

Run a command on all hosts

(Linux) This will run the `cmdall` command. A Linux shell command (or sequence of commands separated by semicolons) may be specified to be executed against all selected hosts.

View iba_host_admin result files

(All) This permits viewing of the `test.log` and `test.res` files which reflect the results from `iba_host_admin` runs (such as those for installing InfiniBand software or rebooting all hosts per menu items above). The user is also given the option to remove these files after viewing them.

If not removed, subsequent runs of `iba_chassis_admin`, `iba_host_admin` or `iba_switch_admin` from within the current directory will continue to append to these files.

Fabric Monitoring

This menu is focused on monitoring the performance of the fabric. Pressing the key corresponding to menu item (0) will toggle the **Skip/Perform** selection for the given item. More than one item may be selected. Once the desired set of items have been selected, enter **P**. To unselect all items, enter **N**. Entering **X** or pressing **ESC** will exit this menu and return to the Main Menu.

Selecting **5** from the **Fast Fabric InfiniBand Tools** menu (Figure 2-3), displays the **Fast Fabric IB Fabric Monitoring Menu** (Figure 2-8)

```
Fast Fabric IB Fabric Monitoring Menu

0) Fabric Performance Monitoring              [Perform]

P) Perform the selected actions               N) Select None
X) Return to Previous Menu (or ESC)
```

Figure 2-8. Fast Fabric IB Fabric Monitoring Menu

Menu Items Description

Selecting item **0** will change the item from **skip** to **perform**. Selecting **N** will unselect all items and **X** will exit the menu system. The item is described below.

Fabric Performance Monitoring

(All) This selection initiates `iba_top`. for full details about `iba_top` refer to Section 3

3 iba_top Fabric Performance Monitor

Introduction

`iba_top` is a command line tool which displays performance, congestion, and error information about a fabric. Fabric information is divided into two areas - performance and error statistics, which are the main starting points for analyzing fabric traffic. Performance (bandwidth utilization) can identify over-utilized areas (bottle necks) and under-utilized areas (potentially misconfigured); errors can identify problems in fabric hardware or configuration, as well as congestion and other performance situations.

iba_top TUI

The `iba_top` TUI screen layout and options consist of four areas in the layout. Image Identification, Screen Specific Information, Common Input Commands, and Screen Specific Input Commands. Figure 3-9shows the top level (summary screen which is being used as an example to show the screen layout. The section following the figure explains each of the areas and the common commands that are available on each screen.

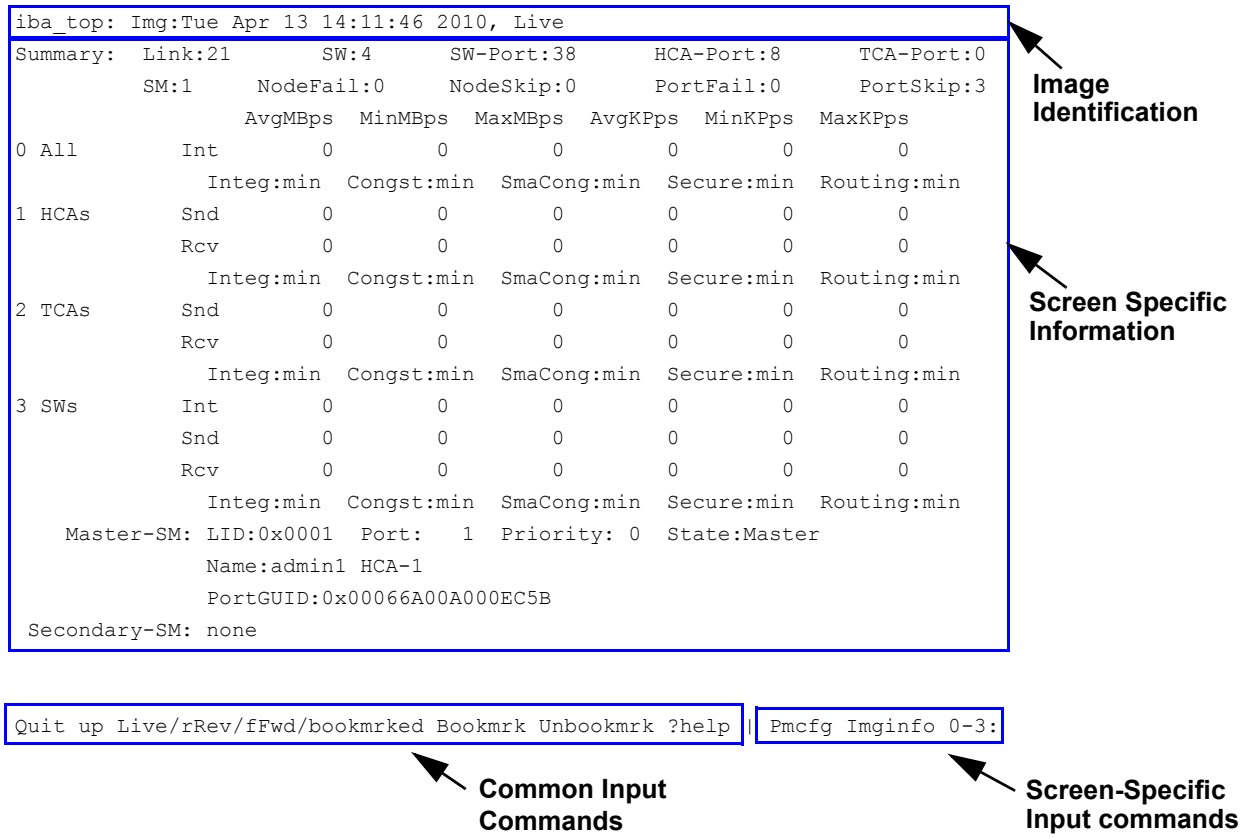
iba_top: Img:Tue Apr 13 14:11:46 2010, Live
Summary: Link:21 SW:4 SW-Port:38 HCA-Port:8 TCA-Port:0
SM:1 NodeFail:0 NodeSkip:0 PortFail:0 PortSkip:3
AvgMBps MinMBps MaxMBps AvgKPps MinKPps MaxKPps
0 All Int 0 0 0 0 0 0
Integ:min Congst:min SmaCong:min Secure:min Routing:min
1 HCAs Snd 0 0 0 0 0 0
Rcv 0 0 0 0 0 0
Integ:min Congst:min SmaCong:min Secure:min Routing:min
2 TCAs Snd 0 0 0 0 0 0
Rcv 0 0 0 0 0 0
Integ:min Congst:min SmaCong:min Secure:min Routing:min
3 SWs Int 0 0 0 0 0 0
Snd 0 0 0 0 0 0
Rcv 0 0 0 0 0 0
Integ:min Congst:min SmaCong:min Secure:min Routing:min
Master-SM: LID:0x0001 Port: 1 Priority: 0 State:Master
Name:admin1 HCA-1
PortGUID:0x00066A00A000EC5B
Secondary-SM: none
Image Identification
Screen Specific Information
Quit up Live/rRev/fFwd/bookmrked Bookmrk Unbookmrk ?help
Pmcfg Imginfo 0-3:
Common Input Commands
Screen-Specific Input commands

Figure 3-9. iba_top TUI Screen Layout

Image Identification

The first display line of **iba_top** shows the timestamp for the PM sweep (image) being displayed and the type of image (Live, Hist, Bkmk). If a Live image is not being displayed, the current time ('Now:') is also shown.

Screen Specific Information

The information and layout of this area of the screen will vary depending on which screen is selected. The information and the layout of this section will be discussed for each specific screen in the following sections.

Command Entry

The last display line of iba_top is a prompt showing available input commands. The left section of commands are available in every screen and perform the same action in each screen. The right section are screen-specific. Commands are case insensitive except as noted by *****; the ENTER key must be pressed after a command. Note that a help command **?** is available at every screen and provides information about the screen contents and input commands.

Common Input Commands

The following input commands are available in every screen:

Q: Quit program;
u*: Up to previous screen;
L: Select Live image;
R: Navigate reverse 1 (**r***) or 5 (**R***) sweeps;
F: Navigate forward 1 (**f***) or 5 (**F***) sweeps;
b*: Select (previously) Bookmarked image;
B*: Bookmark currently selected image;
U*: Unbookmark Bookmarked image;
?: Help

Screen-Specific Input Commands

The screen-specific input commands will be discussed with each screen description in the following sections.

Access to Live and Recent PM Historical Data

`iba_top` allows the user to access statistics from sequential PM sweeps (the PM keeps a history of previous sweep images) and queries the PM at a user-specified interval (10 seconds by default). When `iba_top` queries for statistics for the most recent PM sweep it is in “Live” mode. In Live mode the data will change, at the iba_top interval rate, as iba_top queries new PM sweeps. At each screen (summary or detail) the data being displayed is refreshed for the current PM sweep. A PM sweep can be in “frozen” mode. The data in a frozen sweep will not change, allowing the statistics to be examined in summary and detail screens. Two user actions result in a sweep being frozen.

The first is when the user “Bookmarks” a sweep. A Bookmarked sweep will remain frozen until the user explicitly “Unbookmarks” it; iba_top allows one sweep at a time to be bookmarked. The second action is when the user moves (navigates) `iba_top's` focus to another sweep within the history of sweeps maintained by the PM. For the duration of `iba_top's` focus on such a sweep it will remain frozen. Navigation can occur from Live mode or when displaying a Bookmarked image; during navigation `iba_top` is in “Historic” mode. Navigation can be performed backward or forward, 1 or 5 sweeps at a time.

iba_top TUI Screens

Additional screens, described in the following paragraphs, are available to display detailed information about: PM configuration, PM sweep (image) configuration, performance statistics, error statistics, port group configuration, and port statistics (port counters). The screens can be navigated in a hierarchal manner to examine the state of a fabric.

Summary Screen

The top level (summary) screen of iba_top shows basic fabric configuration information as well as performance and error information. An example of the iba_top summary screen is shown in Figure 3-10.

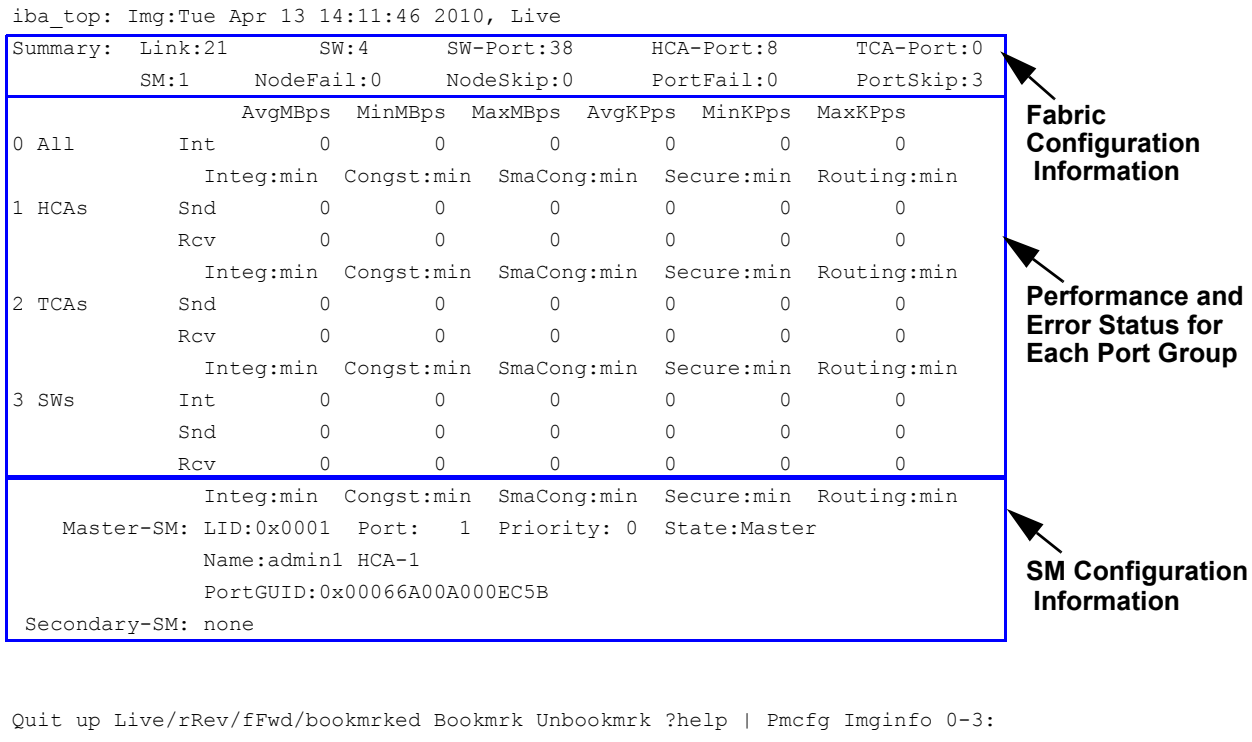
iba_top: Img:Tue Apr 13 14:11:46 2010, Live
Summary: Link:21 SW:4 SW-Port:38 HCA-Port:8 TCA-Port:0
SM:1 NodeFail:0 NodeSkip:0 PortFail:0 PortSkip:3
AvgMBps MinMBps MaxMBps AvgKPps MinKPps MaxKPps
0 All Int 0 0 0 0 0 0
Integ:min Congst:min SmaCong:min Secure:min Routing:min
1 HCAs Snd 0 0 0 0 0 0
Rcv 0 0 0 0 0 0
Integ:min Congst:min SmaCong:min Secure:min Routing:min
2 TCAs Snd 0 0 0 0 0 0
Rcv 0 0 0 0 0 0
Integ:min Congst:min SmaCong:min Secure:min Routing:min
3 SWs Int 0 0 0 0 0 0
Snd 0 0 0 0 0 0
Rcv 0 0 0 0 0 0
Integ:min Congst:min SmaCong:min Secure:min Routing:min
Master-SM: LID:0x0001 Port: 1 Priority: 0 State:Master
Name:admin1 HCA-1
PortGUID:0x00066A00A000EC5B
Secondary-SM: none
Quit up Live/rRev/fFwd/bookmrked Bookmrk Unbookmrk ?help | Pmcfg Imginfo 0-3:
Fabric Configuration Information
Performance and Error Status for Each Port Group
SM Configuration Information

Figure 3-10. iba_top Summary Screen

Fabric configuration information

Fabric configuration information includes numbers of links, switches, SMs, and ports, as well as details about the master and secondary (if present) SMs.

Performance and Error Statistics for Each Port Group

Fabric performance and error statistics are presented based on four groupings of ports: All (all ports in the fabric), HCAs, TCAs and SWs. These groups provide a natural subdivision of the ports in a fabric for analysis. For more information about Groups and the operation of the PM, refer to the *QLogic Fabric Manager User Guide*.

For each port group, average, minimum and maximum MBps (megabytes per second), and KPps (kilopackets per second) are shown, as well as a status indicator for each of five error categories.

Performance Statistics

Performance statistics for each port group are further divided into up to three subgroups - Internal, Send and Receive - based on whether a port's neighbor port is in its group. If a port's neighbor port is in its group, all performance statistics are contained in the Internal subgroup. If a port's neighbor is not in its group, statistics for data leaving the port (group) are contained in the Send subgroup and statistics for data entering the port are contained in the Receive subgroup.

All Group

In the All group all ports are Internal since, by definition, the neighbor port must be in the All group.

HCAs and TCAs Groups

In the HCAs and TCAs groups all neighbor ports are outside the group so statistics are contained in the Send and Receive subgroups.

SWs group

In the SWs group neighbor ports are either outside the group (HCA or TCA) or inside the group (another switch) so statistics are contained in all three subgroups.

Error Categories

The five error categories are:

- `Integ` — Integrity
- `Congst` — Congestion
- `SmaCong` — SMA Congestion
- `Secure` — Security
- `Routing` — Routing

These error categories are each based on one or more port error counters. Each error category’s status indicator is shown at one of five values/colors: minimum/green, Low/blue, Moderate/cyan, Warning/yellow or OVER/red based on the error value as compared to a threshold value.

Screen-Specific Input Commands

The summary screen accepts the following input commands:

P: PM Configuration screen;

I: Image Information screen

0-3: Select Port Group - All (0), HCAs (1), TCAs (2), SWs (3);

Additional Screens

After looking at the summary screen a user can decide which area of the fabric (performance or error) and which group of ports most warrants investigation, and can then *drill down* into that area.

PM Configuration Screen

The PM Configuration screen (Figure 3-11) displays information as provided by the PM (refer to the *QLogic Fabric Manager User Guide*). The Sweep Interval parameter is separate from the iba_top interval. Normally the iba_top interval should be set to a value greater than or equal to Sweep Interval. The PM configuration screen shows the results for image information (total images, freeze images, freeze lease time), error thresholds, integrity weights, PM memory footprint, PMA MADs retry/timeout, and sweep information. The PM Config screen has no screen-specific input commands.

```
iba_top: Img:Mon Feb  1 16:26:02 2010, Bkmk  Now:Mon Feb  1 18:07:09 2010
PM Config:
 Sweep Interval:10 sec  PM Flags(0x17):CaStat EnSwVnd EHcaStat En64Bit
 Total Images:10        Freeze Images:5         Freeze Lease:60      seconds
 Err Thresholds: Integrity:100
                 Congestion:100000        SmaCongest:100
                 Security:10              Routing:100
 Integrity Wts:  Symbol Err:1             Link Recovery:30
                 Port Rcv Err:1           Link Downed:30
                 Loc Link Integ:30        Excess Bfr Ovrn:30
 Congest Wts: Tx Discard %:1        Tx Congest %:1        Tx Ineffic %:1
 PM Memory Size:9 MB (10443860 bytes)
 PMA MADs: MaxAttempts: 0      MinRespTimeout: 0      RespTimeout: 0
 Sweep: MaxParallelNodes: 0      PmaBatchSize: 0


Quit up Live/rRev/fFwd/bookmrked Bookmrk Unbookmrk ?help |
```

Figure 3-11. PM Configuration Screen

Image Information Screen

The Image Information screen (Figure 3-12) displays image information as provided by the PM. Sweep start and duration, numbers of ports in each group, node and port information for the sweep, and SM information is shown. The Image Information screen has no screen-specific input commands.

```
iba_top: Img:Tue Apr 13 15:01:53 2010, Live
Image Info:
 Sweep Start:Tue Apr 13 15:01:53 2010
 Sweep Duration:0.016 Seconds

 Num SW-Ports:38       HCA-Ports:8        TCA-Ports:0        RTR-Ports:0
 Num SWs:4             Num Links:21       Num SMs:1

 Num Fail Nodes:0        Fail Ports:0        Unexpected Clear Ports:0
 Num Skip Nodes:0        Skip Ports:3

    Master-SM: LID:0x0001  Port:   1  Priority: 0  State:Master
               Name:admin1 HCA-1
               PortGUID:0x00066A00A000EC5B
 Secondary-SM: none


Quit up Live/rRev/fFwd/bookmrked Bookmrk Unbookmrk ?help |
```

Figure 3-12. Image Information Screen

Group Information Select Screen

The Group Information Select screen (Figure 3-13) allows the user to select the type of group information to display for the group selected in the summary screen. The following input commands are accepted and lead to the corresponding screen.

W: Performance (Bandwidth Utilization) statistics

E: Error statistics

C: Group configuration (port list)

```
iba_top: Img:Tue Apr 13 15:05:25 2010, Live
Group Info Select:All  NumIntPorts:43  NumExtPorts:0
  Group BW Summary (W)
  Group Err Summary (E)
  Group Config (C)




Quit up Live/rRev/fFwd/bookmrked Bookmrk Unbookmrk ?help | W E C:
```

Figure 3-13. Group Information Screen

Bandwidth Statistics Screen

The Bandwidth Statistics screen (Figure 3-14) displays, for each valid performance data subgroup (Internal, Send, Receive), the total, average, minimum and maximum MBps and KPps. For each subgroup ten performance 'buckets', from 0+% to 90+% in 10% increments, count the number of ports whose 'MBps compared to link speed' value corresponds to that bucket. This provides an indication of how the data rate of the group compares to its potential.

```
iba_top: Img:Mon Feb  1 16:26:02 2010, Bkmk  Now:Mon Feb  1 17:31:24 2010
Group BW Stats:HCAs  Criteria:Util-High  Number:10

Snd TotMBps AvgMBps MinMBps MaxMBps TotKPps AvgKPps MinKPps MaxKPps
       2307     769      20    1864    2274     758      20    1841

 Buckt 0+%   10+%   20+%   30+%   40+%   50+%   60+%   70+%   80+%   90+%
         1      0      1      0      0      0      0      0      0      1

Rcv TotMBps AvgMBps MinMBps MaxMBps TotKPps AvgKPps MinKPps MaxKPps
       2307     769       0    1884    2274     758       0    1861

 Buckt 0+%   10+%   20+%   30+%   40+%   50+%   60+%   70+%   80+%   90+%
         1      0      1      0      0      0      0      0      0      1


Quit up Live/rRev/fFwd/bookmrked Bookmrk Unbookmrk ?help | cC N0-n Detail:
```

Figure 3-14. Bandwidth Statistics Screen

The Bandwidth Statistics screen accepts input commands which specify parameters to be used in a group focus query, which will provide a list of ports (in the port group) sorted according to a specified performance criterion. The second line of the Bandwidth Statistics screen displays the group name, and the currently selected focus criterion and number of ports for a group focus query. The `D` command causes the group focus query to be performed and displayed in a Group Focus screen. The following input commands are accepted in the Bandwidth Statistics screen.

```
C: Select group focus criterion forward (c*) or reverse (C*):
     Util-High: Bandwidth Utilization (highest first)
     UtlPkt-Hi: Packet Utilization (highest first)
     Util-Low: Bandwidth Utilization (lowest first)
Nn: Number of entries n in group focus list
D:  Display detail group focus list
```

Error Statistics Screen

The Error Statistics screen (Figure 3-15) displays error statistics for a port group and are divided into up to two subgroups, Internal or External, based on whether a port's neighbor port is in its group (Internal) or not (External). In the All group all ports are Internal. In the HCAs and TCAs groups all ports are External. In the SWs group ports are Internal and External.

```
iba_top: Img:Tue Apr 13 15:11:47 2010, Live
Group Err Stats:All  Criteria:Integ  Number:10
Int                  Max       0+%      25+%      50+%      75+%     100+%
    Integrity          0        43         0         0         0         0
    Congestion         0        43         0         0         0         0
    SmaCongest         0        43         0         0         0         0
    Security           0        43         0         0         0         0
    Routing            0        43         0         0         0         0
    Congest %:  0.0    Discard:      0    Ineffic %:  0.0    Adapt Rt:0

Ext                  Max       0+%      25+%      50+%      75+%     100+%
    Integrity          0        43         0         0         0         0
    Congestion         0        43         0         0         0         0
    SmaCongest         0        43         0         0         0         0
    Security           0        43         0         0         0         0
    Routing            0        43         0         0         0         0
    Congest %:  0.0    Discard:      0    Ineffic %:  0.0    Adapt Rt:0


Quit up Live/rRev/fFwd/bookmrked Bookmrk Unbookmrk ?help | cC N0-n Detail:
```

Figure 3-15. Error Statistics Screen

The five error categories are each based on one or more port error counters. The integrity and congestion error values are calculated by using a weighted sum. The weights for each and the threshold value for each error category can be seen in the PM Configuration screen (see Figure 3-11). For more details about how the values for each error category is composed, refer to the *QLogic Fabric Manager User Guide*.

```
Integrity:
    Symbol Errors
    Link Error Recovery Count
    Link Downed Count
    Port Receive Errors
    Local Link Integrity Errors
    Excessive Buffer Overrun Errors (neighbor port)
```

```
Congestion:
     Port Transmit Discards (neighbor port)
     Port Transmit Congestion (neighbor port)
     Port Transmit Wait (neighbor port)

SmaCongestion:
     VL15 Dropped Errors

Security:
     Port Receive Constraint Errors
     Port Transmit Constraint Errors (neighbor port)

Routing:
     Port Receive Switch Relay Errors
```

For each error subgroup five error 'buckets', from 0+% to 100+% in 25% increments, count the number of ports whose 'error compared to error threshold' value corresponds to that bucket. This provides an indication of how error rates compare to their thresholds.

In addition, to aid analysis of congestion, the raw values for maximum Congestion, Transmit Discards, Inefficiency, and number of Adaptive Routing adjustments are shown.

The Error Statistics screen accepts input commands which specify parameters to be used in a group focus query, which will provide a list of ports sorted according to a specified error criterion. The second line of the Error Statistics screen displays the group name, and the currently selected focus criterion and number of ports for a group focus query. The `D` command causes the group focus query to be performed and displayed in a Group Focus screen. The following input commands are accepted in the Error Statistics screen.

```
C: Select group focus criterion forward (c*) or reverse (C*):
          Integrity errors (highest first)
          Congestion errors (highest first)
          SmaCongestion errors (highest first)
          Security errors (highest first)
          Routing errors (highest first)
          Adaptive routing (highest first)
Nn: Number of entries n in group focus list
D:  Display detail group focus list
```

Group Configuration Screen

The Group Configuration screen (Figure 3-16) displays a list of the ports in a group, including the LID, port number, port GUID and NodeDesc of each. The second line of the screen displays the group name and the number of ports returned in the group config query. If more ports exist than will fit on a screen, the list can be scrolled forward and backward. An index value, shown with each port, can be used to select the port and show the port's counters in a Port Stats screen. The Group Configuration screen accepts the following input commands.

S: Scroll forward (s*) or backward (S*) through port list

Pn: Select port index value n

```
iba_top: Img:Wed Sep 21 12:51:58 2011, Live
Group Config:All  NumPorts:43
 Ix LIDx Port   Node GUID 0x   NodeDesc
  0 0001  1   00066A009800EC5B admin1 HCA-1
  1 0002  1   00066A00070014DC i9k066 L02
  2 0002  2   00066A00070014DC i9k066 L02
  3 0002  7   00066A00070014DC i9k066 L02
  4 0002  8   00066A00070014DC i9k066 L02
  5 0002  9   00066A00070014DC i9k066 L02
  6 0002  11  00066A00070014DC i9k066 L02
  7 0002  13  00066A00070014DC i9k066 L02
  8 0002  14  00066A00070014DC i9k066 L02
  9 0002  15  00066A00070014DC i9k066 L02
 10 0002  16  00066A00070014DC i9k066 L02
 11 0002  17  00066A00070014DC i9k066 L02
 12 0002  18  00066A00070014DC i9k066 L02
 13 0002  19  00066A00070014DC i9k066 L02
 14 0002  20  00066A00070014DC i9k066 L02
 15 0002  21  00066A00070014DC i9k066 L02
 16 0002  22  00066A00070014DC i9k066 L02
 17 0002  23  00066A00070014DC i9k066 L02
 18 0002  24  00066A00070014DC i9k066 L02
Quit up Live/rRev/fFwd/bookmrked Bookmrk Unbookmrk ?help | sS P0-n:
```

Figure 3-16. Group Configuration Screen

Group Focus Screen

The Group Focus screen (Figure 3-17) displays a list of the ports the user has selected to focus on within a group, including the LID, port number, focus criterion, port GUID and NodeDesc of each. If the port has a neighbor port, the same information is displayed for the neighbor. The second line of the screen displays the group name, the number of ports selected by in the combination of group, criteria and requested ports, and the number of ports requested in the group focus query. If more ports exist than will fit on a screen, the list can be scrolled forward and backward. Like the Bandwidth Statistics and Error Statistics screens which precede this screen, the focus criterion and number of requested focus ports can be changed to modify the focus port list. An index value, shown with each port, can be used to select the port and show the port's counters in a Port Stats screen. The Group Focus screen accepts the following input commands.

```
S: Scroll forward (s*) or backward (S*) through port list
C: Select group focus criteria forward (c*) or reverse (C*):
     Bandwidth Utilization (highest first)
     Packet Utilization (highest first)
     Bandwidth Utilization (lowest first)
     Integrity errors (highest first)
     Congestion errors (highest first)
     SmaCongestion errors (highest first)
     Security errors (highest first)
     Routing errors (highest first)
     Adaptive Routing (highest first)
Nn: Number of entries n in group focus list
Pn: Select port index value n
```

```
iba_top: Img:Wed Sep 21 13:01:21 2011, Live
Group Focus:All  GrpNumPorts:43  NumPorts:3  Number:3
 Ix Integrity LIDx Port   Node GUID 0x   NodeDesc
  0         0 0001  1   00066A009800EC5B admin1 HCA-1
<->         0 0002  1   00066A00070014DC i9k066 L02
  1         0 0002  2   00066A00070014DC i9k066 L02
<->         0 0003  1   00066A009800EC51 compute0001 HCA-1
  2         0 000C  1   00066A0098007B5E compute0004 HCA-1
<->         0 0007  24  00066A00D9000108 i9k108
```

```
Quit up Live/rRev/fFwd/bookmrked Bookmrk Unbookmrk ?help | sS cC N0-n P0-n:
```

Figure 3-17. Group Focus Screen

Port Statistics Screen

The Port Statistics screen (Figure 3-18) displays a port's counters (performance and error). Error counters are grouped according to the error category to which they belong. A trailing asterisk ('*') on the counter name indicates the count will be used in computing Error Category information for the neighbor port. When the Port Statistics screen is entered from the Group Focus screen, port neighbor and link information is available. When the Port Statistics screen is entered from the Group Configuration screen this information is not available. The second line of the Port Statistics screen displays the group name, and LID and port number of the port, as well as link rate and MTU (if available). The third line of the screen displays the NodeDesc and Node GUID of the port. The fourth line of the screen displays the NodeDesc, LID and port number of the neighbor port (if available). The Port Statistics screen accepts the following input command (when neighbor information is available).

N: Switch between statistics for port and port's neighbor

```
iba_top: Img:Mon Apr  5 00:01:28 2010, Live
Port Stats:All  LID:0x28  PortNum:10  Rate: 40g  MTU:4096
NodeDesc:i12k71f  NodeGUID:0x00066A00E300271F
Neighbor:pyro HCA-1  LID:0x7  PortNum:2
 Xmit: Data:0          MB (3168       Quads) Pkts:44
 Recv: Data:0          MB (1152       Quads) Pkts:16

 Integrity:                        SmaCongest:
  Symbol:0                          VL15 Dropped:0
  Link Recovery:0
  Link Downed:0
  Port Rcv:0                       Security:
  Loc Lnk Integrity:0               Port Rcv Constrain:0
  Excess Bfr Overrun*:0             Port Xmt Constrain*:0

 Congestion:                       Routing:
  Port Xmt Discards*:0              Port Rcv Sw Relay:0
  Port Xmt Congest*:0         (  0.0%)
  Congest Inefficiency*:  0.0%

 Port Rcv Rmt Phy:0                Port Adapt Route:0
                                   Port Check Rate:2000 per sec
Quit up Live/rRev/fFwd/bookmrked Bookmrk Unbookmrk ?help | Neighbor
```

Figure 3-18. Port Statistics Screen

Command Line Options

The following command line options are available for `iba_top`:

Usage:

```
iba_top [-v][-q] [-h hca] [-p port] [-i seconds]
or
iba_top --help
```

Options

`--help` — produce full help text

`-v/--verbose level` — verbose output level (additive):

`1` — Screen

4 — STDERR (iba_top)

16 — STDERR PaClient

-q/--quiet — disable progress reports

-h/--hca *hca* — hca to send by, default is 1st hca

-p/--port *port* — port to send by, default is 1st active port

-i/--interval *seconds* — obtain performance stats over interval seconds

4 Real-Time Fabric Monitor

Real-time Fabric Monitor Overview

The Real-time Fabric Monitor (RFM) is a TUI based user interactive application that provides real-time fabric monitoring support. It must be run on a host connected to the InfiniBand fabric with FastFabric installed. To use the Performance view of RFM the QLogic Fabric Manager must be installed.

The RFM obtains all its data in an InfiniBand Trade Association (IBTA)-compliant manner. Therefore, it will interoperate with both QLogic and 3rd party InfiniBand components, provided those components are IBTA compliant and implement the IBTA optional features required by the RFM

The RFM requires that the subnet manager implement all the IBTA SA queries defined in the standard (such as SM Info records, Link Records, Trace Routes, Port Records, Node Records, etc). As such, it is recommended that the QLogic Fabric Manager version 4.0 or later be used. The RFM requires all end nodes to implement the PMA PortCounters (IBTA mandatory counters). Also any end nodes which report support of a IBTA device management agent must implement the IOU Info, IOC Profile and Service Entry queries as outlined in the IBTA 1.1 standard.

The RFM takes advantage of these interfaces to obtain extensive information about the fabric from the subnet manager and the end nodes. Using this information, the RFM is able to cross reference it and produce analysis greatly beyond what any single subnet manager request could provide. As such, it exceeds the capabilities previously available in tools such as **`iba_saquery`** and **`fabric_info`**.

The RFM displays the information in a user-friendly TUI based user interface. The RFM user interface enables users to analyze the information, using interactive requests from the user.

The RFM obtains up to date information about the fabric by performing a discovery of the fabric when it is first started. Each discovery will take a few seconds (or less, depending on the size of the fabric) to obtain all the fabric data.

The RFM is started by entering the following command at a command prompt.

Syntax

```
iba_rfm  [-v] [-h<hca>] [-p<port>] [-i<seconds>] [-I<seconds>]
```

or

```
iba_rfm --help
```

Options

-v — verbose output.This will cause all message types (Errors, Warnings and Debug) to be output to the screen

-h/--hca<hca> — hca to send by, default is 1st hca

-p/--port<port> — port to send by, default is 1st active port

-i/ --interval<seconds> — topology sweep interval, default is 10 seconds

-I/ --interval<seconds> — PM sweep interval, default is 10 seconds

--help — produce full help text and information on how to use **iba_rfm**

RFM Screen Layout and User Interaction

The RFM essentially provides a portal into the fabric environment, in order to enable the administrator to focus on specific facets of the fabric that are of interest. This is accomplished by a view in the RFM, which defines a specific category of information pertaining to the fabric environment. Figure 4-19 is the main menu of the RFM.

```
>
MENU:    (A)dmin, (Q)uit
FABRIC: Img: [Tue Mar 16 09:16:38 2010, Live],
             SWs: 8,  HCAs: 5,  TCAs: 0,  Nodes: 9,  SMs: 2
             Links: 28,  SWsPorts: 62,  HCAsPorts: 2,  TCAsPorts: 0

GROUP        AvgMBps    MinMBps    MaxMBps    AvgKPps    MinKPps    MaxKPps
1 All     Int   0          0          0          0          0          0
             Integ:Min  SmaCong:Min  Congst:Min    Secure:Min    Rtng:Min
2 HCAs    Snd   0          0          0          0          0          0
          Rcv   0          0          0          0          0          0
             Integ:Min  SmaCong:Min  Congst:Min    Secure:Min    Rtng:Min
3 TCAs    Snd   0          0          0          0          0          0
          Rcv   0          0          0          0          0          0
          Integ:Min     SmaCong:Min  Congst:Min    Secure:Min    Rtng:Min
4 SWs     Snd   0          0          0          0          0          0
          Rcv   0          0          0          0          0          0
             Integ:Min  SmaCong:Min  Congst:Min    Secure:Min    Rtng:Min

VID            VIEWS
 1      Infrastructure View
 2      Fabric View

SUBMENU: (L)v, (rR)v, F(wW)d, (b)kmrkd, (B)kmrk, (U)nbkmrk, (G)rp<1-4><u|e>
```

Figure 4-19. RFM Main Screen

The Views are as follows:

- **`Infrastructure View`** — enables a user to focus on the infrastructure specific elements and characteristics of the fabric, such as Switches and CAs.
- **`Fabric View`** — enables a user to focus on the networking specific elements and characteristics of the fabric, such as links and SMs.
- **`Performance View`** — enables a user to focus on the customer defined performance specific elements and characteristics of the fabric. A user gains access to this view using the `SUBMENU` command: (G)rp<1-4><u|e>.

After selecting a view, the user may drill down into increasing levels of detail regarding items in that category of view.

The screens of RFM are segmented into fixed sections that provide specific information about the fabric environment, and the actions taken by the user. The following subsections describe the different screens and the segments of each screen starting with the main menu shown in Figure 4-19.

Main Screen

The RFM main screen shown in Figure 4-20 shows a brake down of the segments in the TUI screen. The following subsections describe each segment of the screen.

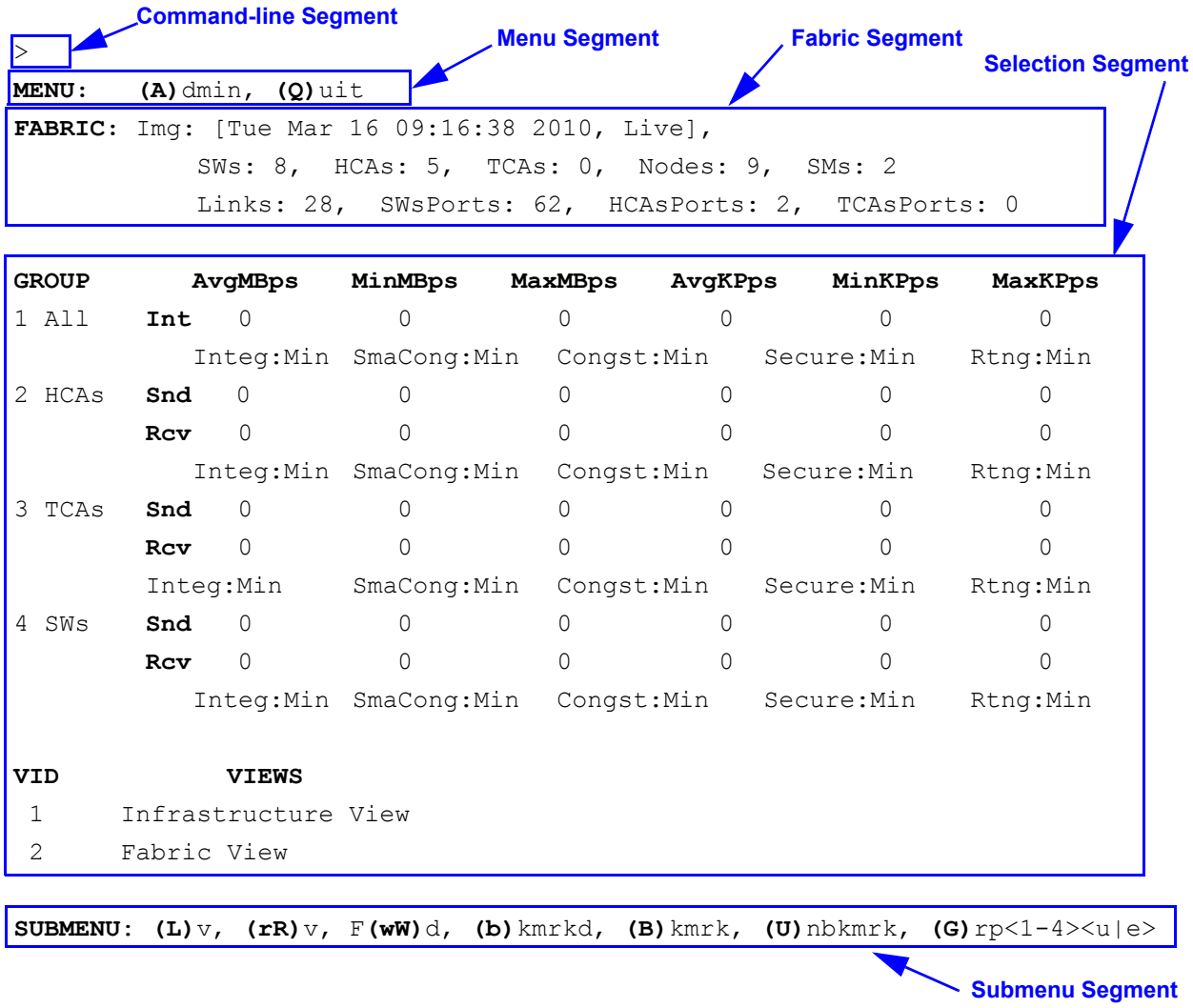
Command-line Segment
Menu Segment
Fabric Segment
Selection Segment
>
MENU: (A)dmin, (Q)uit
FABRIC: Img: [Tue Mar 16 09:16:38 2010, Live],
SWs: 8, HCAs: 5, TCAs: 0, Nodes: 9, SMs: 2
Links: 28, SWsPorts: 62, HCAsPorts: 2, TCAsPorts: 0
GROUP AvgMBps MinMBps MaxMBps AvgKPps MinKPps MaxKPps
1 All Int 0 0 0 0 0 0
Integ:Min SmaCong:Min Congst:Min Secure:Min Rtng:Min
2 HCAs Snd 0 0 0 0 0 0
Rcv 0 0 0 0 0 0
Integ:Min SmaCong:Min Congst:Min Secure:Min Rtng:Min
3 TCAs Snd 0 0 0 0 0 0
Rcv 0 0 0 0 0 0
Integ:Min SmaCong:Min Congst:Min Secure:Min Rtng:Min
4 SWs Snd 0 0 0 0 0 0
Rcv 0 0 0 0 0 0
Integ:Min SmaCong:Min Congst:Min Secure:Min Rtng:Min
VID VIEWS
1 Infrastructure View
2 Fabric View
SUBMENU: (L)v, (rR)v, F(wW)d, (b)kmrkd, (B)kmrk, (U)nbkmrk, (G)rp<1-4><u|e>
Submenu Segment

Figure 4-20. Main Menu Segments

Command-line Segment

The Command-line segment of the screen (Figure 4-20) enables the user to submit commands to control RFM. This is the only section of the screen where user typing will appear. All other sections of the screen are output only.

Menu Segment

The Menu segment of the screen (Figure 4-20) displays any menu selections available for the user to utilize for the screen being displayed. The available selections have a bolded first letter. The other selections are not available.

The menu selections for the main screen are as follows:

- (A)dmin — Selects the Administration screen. This controls operation of the RFM, such as viewing and/or changing the RFM configuration options.
- (Q)uit — Exits the RFM.

Fabric Segment

The Fabric segment of the screen (Figure 4-20) displays summary information about the fabric, specific to the View that the user is currently accessing.

The following are the possible types of information that could be shown:

- Image — PV performance image time-stamp and view mode: Live, Hist, or Bkmk,
- SWs — number of switches within the fabric
- HCAs — number of Host Channel adapters within the fabric
- TCAs — number of Target Channel adapters within the fabric
- SMs — number of Subnet Managers within the fabric
- Links — number of links within the fabric
- SWsPorts — number of ports specific to switches within the fabric
- HCAsPorts — number of ports specific to HCAs within the fabric
- TCAsPorts — number of ports specific to TCAs within the fabric
- Nodes — number of nodes within the fabric
- Montrd — number of nodes the RFM is configured to monitor.
- Oprtnl — number of nodes that are currently operational.
- HlthErrs — number of health related errors within the fabric.
- CommErrs — number of communication related errors within the fabric.
- Alarms — number of alarms generated within the fabric

NOTE:

HlthErrs and Alarms are not presently implemented and will report “Not Avail”

Selection Segment

The Selection segment of the screen (Figure 4-20) displays the various Views and Contexts selections available. Each View selection has a numeric View Identifier (VID) associated with it and each Context selection has a numeric Context Identifier (CID) associated with it. The user may select an available View/Context by entering the numeric VID/CID at the Command-line section.

The area of this segment listing groups and their respective bandwidth utilization and error statistics, is summary information for the Performance View. Unlike the other View selections, a user gains access to this View using the `SUBMENU` command: (G)rp<1-4><u|e>

Submenu Segment

The Submenu segment of the screen (Figure 4-20) displays the following submenus that can be selected for the main screen.

- (L)v — this option selects the live image
- (rR)v — this option reverse step/skips thru historical images
- F(Ww)d — this option forward step/skips thru historical images
- (b)kmrkd — this option selects the current bookmarked image
- (B)kmrk — this option bookmarks the current image
- (U)nbkmrk — this option unbookmarks the current bookmarked image
- (G)rp<1-4><u|e>
  - 1 — this option selects the All group
  - 2 — this option selects the HCAs group
  - 3 — this option selects the TCAs group
  - 4 — this option selects the SWs group
  - u — this option selects the utilization statistics category
  - e — this option selects the error statistics category
- (e)rror<1-6>
  - 1 — this option selects the Integrity error category
  - 2 — this option selects the Congestion error category

  - 3 — this option selects the Sma Congestion error category
  - 4 — this option selects the Security error category
  - 5 — this option selects the Routing error category
  - 6 — this option selects the Adaptive Route error category
- (u)til<h|p|l>
  - h — this option selects the High BW utilization category
  - p — this option selects the Packet Utilization High category
  - l — this option selects the Low BW utilization category
- (p)rvPg — this sub-menu selection returns the user to the previous screen
- Scrl(d)wn — this sub-menu selection lists the next page of information
- Scrl(u)p — this sub-menu selection lists the previous page of information
- Ls(t)<n> — this sub-menu selection adjusts the size of lists displaying a list of information
- (cC)rit — this sub-menu selection forward/reverse switch between utilization and error categories
- Im(g)Info — this sub-menu selection displays the Image Info
- Fr(Z) — this sub-menu selection freezes the topology
- Unfr(Z) — this sub-menu selection unfreezes the topology
- (+/-) — this sub-menu selection toggles between primary/secondary sub-menu option selections

View Screen

Each View has a unique Top-level View Summary screen, which enables a user to focus on elements and characteristics of the fabric specific to the selected View. The Top-level View Summary screen displays when the Infrastructure View, Fabric View, or Performance View is selected from the Main screen. An example of a Top-level Infrastructure View Summary screen is shown in Figure 4-21. The following subsections describe the segments of the screen.

```
>
MENU:    (H)ome, (F)abricView, (P)erformanceView, (A)dmin, (Q)uit
VIEW:    [I]:H
CONTEXT: Name: Infrastructure View
FABRIC:  Top: [Wed Sep 21 13:10:13 2011, Live],
         SWs:      4,  HCAs:      8,  TCAs:      0,  Nodes:     12,  SMs: 2
        Links:     21,  SWsPorts:     38,  HCAsPorts:     8,  TCAsPorts:     0
         HlthErrs: Not Avail,  CommErrs:      65631,  Alrms: Not Avail

                    INFRASTRUCTURE VIEW INFORMATION

CID  CATEGORY       TOTAL  MONTRD  OPRTNL HLTH-ERRS COMM-ERRS      ALRMS
1    Switches           4       4       4         0     65600  Not Avail
2    CAs                8       8       8         0        31  Not Avail
3    Chassis            0       0       0         0         0  Not Avail
4    Servers            0       0       0         0         0  Not Avail
5    Cables             0       0       0         0         0  Not Avail
6    Routers            0       0       0         0         0  Not Avail
7    Applications       0       0       0         0         0  Not Avail



SUBMENU: (p)rvPg, Fr(Z), Unfr(z)
```

Figure 4-21. View Screen

Menu Section

This section of the screen displays any menu selections available for the user to utilize for the screen being displayed (Figure 4-22). The available selections have a bolded first letter. The other selection are not available.

```
>
MENU:    (H)ome, (F)abricView, (P)erformanceView, (A)dmin, (Q)uit
VIEW:    [I]:H
```

Figure 4-22. Menu Section

The menu selections for the main screen are as follows:

- `(H)ome` - this menu selection returns the user to the Main screen

- (F)abricView - this menu selection takes the user to the Fabric View main screen, which enables a user to focus on networking specific elements and characteristics of the fabric. This selection is available when in Infrastructure and Performance View.
- (I)nfrastructureView - this menu selection takes the user to the Infrastructure View main screen, which enables a user to monitor and query components in the fabric. This selection is available when in Fabric and Performance View
- (P)erformanceView - this menu selection takes the user to the active Performance View main screen, which enables a user to focus on performance specific elements and characteristics of the fabric.
- (A)dmin — this menu selection takes the user to the Administration screen, which enables a user to focus on administrative related operations of the RFM, such as changing/viewing configuration options.
- (Q)uit — Exits the RFM.

View Section

This provides a historical description of the screens traversed by the user to arrive at the present screen (Figure 4-23). The first letter is the view type followed by the hierarchy of screens as the user drives deeper into the fabric. Each screen abbreviation (first letter) is shown in order.

```
>
MENU:    (H)ome, (F)abricView, (P)erformanceView, (A)dmin, (Q)uit
VIEW:    [I]:H
CONTEXT: Name: Infrastructure View
FABRIC:  Top: [Wed Sep 21 13:10:13 2011, Live],
```

Figure 4-23. View Section

The following format is used:

```
[view-abbreviation]:<screen-abbreviation>:<screen-abbreviation>
```

The presently supported view-abbreviations are Infrastructure View [I], Fabric View [F], and Performance View [P].

Context Section

This displays the Context of the current screen (Figure 4-24).

```
MENU:     (H)ome, (F)abricView, (P)erformanceView, (A)dmin, (Q)uit
VIEW:     [I]:H
CONTEXT: Name: Infrastructure View
FABRIC:  Top: [Wed Sep 21 13:10:13 2011, Live],
```

Figure 4-24. Context Section

The Context Section will always contain the name of the context and could include other information at various levels. The full list of information included in the Context section are:

- `Name` — name of the current context
- `Total <element-name>` — number of this specific element that exist in the current context
- `Alarms` — number of alarms generated relevant to the current Context.

Fabric Section

This section includes the same type of information in all screens. Refer to “Fabric Segment” on page 4-5

Information Section

This section displays general information about a specific context within the fabric. This section of the screen contains different information based on the view, category, and element type. The Infrastructure, Fabric, and Performance view information is described below. The other layouts of this section will be discussed in their appropriate subsections.

```
          HlthErrs: Not Avail,  CommErrs:      65631,  Alrms: Not Avail
```

INFRASTRUCTURE VIEW INFORMATION

CID	CATEGORY	TOTAL	MONTRD	OPRTNL	HLTH-ERRS	COMM-ERRS	ALRMS
1	Switches	4	4	4	0	65600	Not Avail
2	CAs	8	8	8	0	31	Not Avail
3	Chassis	0	0	0	0	0	Not Avail
4	Servers	0	0	0	0	0	Not Avail
5	Cables	0	0	0	0	0	Not Avail
6	Routers	0	0	0	0	0	Not Avail
7	Applications	0	0	0	0	0	Not Avail

```
SUBMENU: (p)rvPg, Fr(Z), Unfr(z)
```

Figure 4-25. Infrastructure and Fabric View Information Section

The following are the definitions of each column in the Information Section for the Infrastructure and Fabric Views:

- CID — Numeric Context Identifier (CID)
- CATEGORY — Element type
- TOTAL — Total number of the element type in the fabric
- MONTRD — Indicates number of the element type that RFM is configured to monitor. Applies to Switches, CAs, Links, and SMs only
- OPRTNL — Indicates number of the element type that is currently operational. Applies to Switches, CAs, Links, and SMs only
- HLTHERRS — Number of health related errors associated with the element type
- COMM-ERRS — Number of communication related errors associated with the element type.
- ALRMS — number of alarms generated that are associated with the element type.

```
PERF:    GrpName: All, GrpNumPrts: 107, LstNumPrts: 10,
         LstMaxNumPrts: 10, NodesFailed: 0, NodesSkipped: 0,
         PortsFailed: 0, PortsSkipped: 9
```

All GROUP ERROR STATS INFORMATION

Int	Max	0+%	25+%	50+%	75+%	100+%
Integrity	0	98	0	0	0	0
Congestion	0	98	0	0	0	0
SmaCongest	0	98	0	0	0	0
Security	0	98	0	0	0	0
Routing	0	98	0	0	0	0

Congest %: 0.0 Discard: 0 Ineffic %: 0.0 Adapt Rt:0

SUBMENU: (+), (p)rvPg, (e)rr<1-6>, Ls(t)<n>, Im(g)Info

Figure 4-26. Performance View Error Conditions Information Section

The following are the definitions of each column in the Information Section for the Error Conditions category of the Performance View:

- Buckt % — number of ports within given percentage of error conditions
- Integrity — link integrity related errors
- Congestion — link congestion related errors
- SmaCongest — link SMA congestion related errors
- Security — link security related errors
- Routing — link routing related errors
- Adaptive routing — Adaptive routing related errors

```
PERF:     GrpName: All, GrpNumPrts: 107, LstNumPrts: 10,
          LstMaxNumPrts: 10, NodesFailed: 0, NodesSkipped: 0,
          PortsFailed: 0, PortsSkipped: 9
```

All GROUP BW STATS INFORMATION

Int	TotMBps	AvgMBps	MinMBps	MaxMBps	TotKPps	AvgKPps	MinKPps	MaxKPps
	0	0	0	0	0	0	0	0

Buckt	0+%	10+%	20+%	30+%	40+%	50+%	60+%	70+%	80+%	90+%
	98	0	0	0	0	0	0	0	0	0

```
SUBMENU: (+), (p)rvPg, (u)til<h|l>, Ls(t)<n>, Im(g)Info
```

Figure 4-27. Performance View Bandwidth Utilization Information Section

The following are the definitions of each column in the Information Section for the Bandwidth Utilization category of the Performance View:

- Int — ports sub-group, which indicates that both ports of a link are in a single group
- Snd — ports sub-group, which indicates that a port of a link sends from group to outside
- Rcv — ports sub-group, which indicates that a port of a link receives by group from outside
- TotMBps — Total of MBps of all selected ports
- AvgMBps — average MB per second of all selected ports
- MinMBps — minimum MB per second of all selected ports
- MaxMBps — maximum MB per second of all selected ports
- TotKPps — Total of KPps of all selected ports
- AvgKPps — average kilo packets/sec of all selected ports
- MinKPps — minimum kilo packets/sec of all selected ports
- MaxKPps — maximum kilo packets/sec of all selected ports
- Buckt % — number of ports within given percentage of bandwidth utilization

Sub-Menu Section

Displays an additional set of minor menu selections that are available. These menu selections exist to assist the user with miscellaneous operations (i.e., maneuvering through the screens).

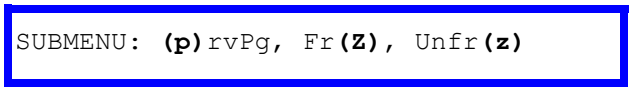

Figure 4-28. Infrastructure and Fabric View Sub-Menu Section

The menu selections supported are the following:

- (p)rvPg — return to the previous screen
- Scroll (d)own — scroll down to the next screen of information being listed.
- Scroll (u)p — scroll up to the previous screen of information being listed.
- Fr(Z) — freezes the current topology sweep
- Unfr(z) — unfreezes the current topology sweep

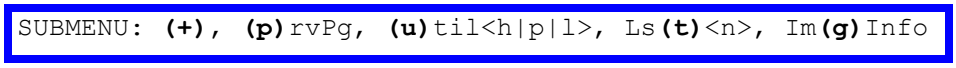

Figure 4-29. Performance View Bandwidth Utilization Sub-Menu Section

The primary menu selections supported for the Performance View are the following:

- (+/-) — toggles between the primary/secondary sub-menu selections
- (p)rvPg — return to the previous screen.
- Scrl(d)wn — scroll down to the next screen of information being listed.
- Scrl(u)p — scroll up to the previous screen of information being listed.
- (u)til<h|p|l> — selects the high/low bandwidth or high packet utilization category
- (e)rr<1-6> — selects an error category: 1) Integrity, 2) Congestion, 3) Sma Congestion, 4) Security, 5) Routing, 6) Adaptive Route
- Ls(t)<n> — adjusts the size of lists displaying a list of information
- Im(g)Info — displays the Image Information of the current image

- (cC)rit — forward/reverse switch between utilization and error categories
- (n)eighbor — displays information about the neighbor port of a link

The secondary menu selections supported for the Performance View are the following:

- (L)v — selects the live image
- (rR)v — reverse step/skips thru historical images
- F(wW)d —forward step/skips thru historical images
- (b)kmrkd —selects the current bookmarked image
- (B)kmrk —bookmarks the current image
- (U)nbkmrk —unbookmarks the current bookmarked image

Infrastructure View Sub-Screens

Switch Node Screens

When the user selects the Switches category from the main screen of the Infrastructure Section View Screen discussed in "Submenu Segment" on page 4-6 above, screens are displayed to enable the user to drill-down to a specific switch of interest. The order in which these screens are displayed will depend upon the number of switches found within the fabric.

NOTE:

A Switch Node represents a single Switch Chip within the fabric. Large switches, such as the QLogic12000 or SilverStorm 9240 are composed of many Switch Chips and will be displayed as multiple Switch Nodes within the screens which follow.

Switch Node Selection Screen (500+ Switch Nodes)

If there are 500 or more switch nodes found within the fabric, Figure 4-30 is an example of the screen that will be displayed first.

```
MENU:    (H)ome, (I)nfrastructureView, (F)abricView, (P)erformanceView,
         (T)opContext, (A)dmin, (Q)uit
VIEW:    [I]:H:I
CONTEXT: Name: Switches, Total Switches:   500,  Alrms: Not Avail
FABRIC: Top: [Mon Feb 1 16:50:13 2010, Hist], Now: Mon Feb 1 16:54:39 2010
              SWs: 500, HCAs: 50, TCAs: 0, Nodes: 527, SMs: 1
              Links: 48, SWsPorts: 12000, HCAsPorts: 54, TCAsPorts: 0
              HlthErrs: Not Avail, CommErrs: 297, Alrms: Not Avail
```

CID	SWITCHES	ERRORS	CID	SWITCHES	ERRORS
1	1 - 499	0	11	5000 - 5499	0
2	500 - 999	0	12	5500 - 5999	0
3	1000 - 1499	0	13	6000 - 6499	0
4	1500 - 1999	0	14	6500 - 6999	0
5	2000 - 2499	0	15	7000 - 7499	0
6	2500 - 2999	0	16	7500 - 7999	0
7	3000 - 3499	0	17	8000 - 8499	0
8	3500 - 3999	0	18	8500 - 8999	0
9	4000 - 4499	0	19	9000 - 9499	0
10	4500 - 4999	0	20	9500 - 10000	0

```
SUBMENU: (p)rvPg, Fr(Z), Unfr(z)
```

Figure 4-30. Switch Node Selection Screen (500+ Switch Nodes)

Switch Node Selection Screen (26-500 Switch Nodes)

After selecting a block of 500 switch nodes or if there are between 26 to 500 switch nodes found within the fabric Figure 4-31 is an example of the screen that will be displayed.

```
MENU:     (H)ome, (I)nfrastructureView, (F)abricView, (P)erformanceView,
          (T)opContext, (A)dmin, (Q)uit
VIEW:     [I]:H:I:Sw1-499
CONTEXT: Name: Switches 1 - 499, Total Switches: 500, Alrms: Not Avail
FABRIC: Top: [Mon Feb 1 16:50:13 2010, Hist], Now: Mon Feb 1 16:54:39 2010
           SWs: 500, HCAs: 50, TCAs: 0, Nodes: 527, SMs: 1
           Links: 48, SWsPorts: 12000, HCAsPorts: 54, TCAsPorts: 0
           HlthErrs: Not Avail, CommErrs: 297, Alrms: Not Avail
```

CID	SWITCHES			ERRORS	|	CID	SWITCHES			ERRORS
1	1	-	25	0	|	11	251	-	275	0
2	26	-	50	0	|	12	276	-	300	0
3	51	-	75	0	|	13	301	-	325	0
4	76	-	100	0	|	14	326	-	350	0
5	101	-	125	0	|	15	351	-	375	0
6	126	-	150	0	|	16	376	-	400	0
7	151	-	175	0	|	17	401	-	425	0
8	176	-	200	0	|	18	426	-	450	0
9	201	-	225	0	|	19	451	-	475	0
10	226	-	250	0	|	20	476	-	500	0

```
SUBMENU: (p)rvPg, Fr(Z), Unfr(z)
```

Figure 4-31. Switch Node Selection Screen (26-500 Switch Nodes)

Switch Node Selection Screen (1-25 Switch Nodes)

After selecting a block of 25 switch nodes or if there are between 1 to 25 switch nodes found within the fabric, Figure 4-32 is an example of the screen that will be displayed.

```
MENU:    (H)ome, (I)nfrastructureView, (F)abricView, (P)erformanceView,
         (T)opContext, (A)dmin, (Q)uit
VIEW:    [I]:H:I:Sw1-499:Sw1-25
CONTEXT: Name: Switches 1 - 25, Total Switches: 14, Alrms: Not Avail
FABRIC: Top: [Mon Feb 1 16:50:13 2010, Hist], Now: Mon Feb 1 16:54:39 2010
          SWs: 500, HCAs: 50, TCAs: 0, Nodes: 527, SMs: 1
          Links: 48, SWsPorts: 12000, HCAsPorts: 54, TCAsPorts: 0
          HlthErrs: Not Avail, CommErrs: 297, Alrms: Not Avail
```

CID	SWITCH	TYPE	PORTS	ERRORS	NODE DESC
1	0x00066a000600025a	DDR	24	0	SilverStorm 9080 GUID=0x00066a
2	0x00066a00060002f7	DDR	24	0	SilverStorm 9080 GUID=0x00066a
3	0x00066a0007000311	DDR	24	0	SilverStorm 9080 GUID=0x00066a
4	0x00066a00070003bb	DDR	24	0	SilverStorm 9080 GUID=0x00066a
5	0x00066a0007000df3	DDR	24	0	SilverStorm 9080 GUID=0x00066a
6	0x00066a0007000df6	DDR	24	0	SilverStorm 9080 GUID=0x00066a
7	0x00066a0007000e03	DDR	24	0	SilverStorm 9080 GUID=0x00066a
8	0x00066a0007000e6d	DDR	24	0	SilverStorm 9080 GUID=0x00066a
9	0x00066a00d900045f	DDR	24	0	i9k45f
10	0x00066a00d9000479	DDR	24	0	i9k479
11	0x00066a00dd000075	DDR	24	0	SilverStorm 9080 GUID=0x00066a
12	0x00066a00de00004d	DDR	24	0	SilverStorm 9080 GUID=0x00066a

```
SUBMENU: (p)rvPg, Fr(Z), Unfr(z)
```

Figure 4-32. Switch Node Selection Screen (1-25 Switch Nodes)

Switch Node Information Selection Screen

Figure 4-33 is an example of the screen for selecting specific information for a switch node within the fabric.

```
MENU:     (H)ome, (I)nfrastructureView, (F)abricView, (P)erformanceView,
          (T)opContext, (A)dmin, (Q)uit
VIEW:     [I]:H:I:Sw13
CONTEXT: Name: 0x00066a00d90000479, Total Switches:    11
FABRIC: Top: [Tue Feb 2 07:31:25 2010, Hist], Now: Tue Feb 2 07:51:50 2010
               SWs: 11, HCAs: 3, TCAs: 0, Nodes: 14, SMs: 1
               Links: 48, SWsPorts: 103, HCAsPorts: 4,  TCAsPorts: 0
               HlthErrs: Not Avail,  CommErrs:       297,  Alrms: Not Avail
SWITCH:  Montrd: TRUE, Oprtnl: TRUE, HlthErrs: Not Avail,
          CommErrs: 285, Alrms: Not Avail, Type: n/a, Ports: 24,
          NodeGUID: 0x00066a00d9000479, NodeDesc: i9k479

CID  NODE INFORMATION
 1     Device Info
 2     Ports Info
 3     Chassis Info
 4     Module Info
 5     Partition Info
 6     Health Info

SUBMENU: (p)rvPg, Fr(Z), Unfr(z)
```

Figure 4-33. Switch Node Information Selection Screen

NOTE:

In the present release only the Device Info and Ports Info Categories are implemented.

Switch Node Device Information Screen

Figure 4-34 is an example of the screen for viewing device specific information for a switch node within the fabric.

```
MENU:    (H)ome, (I)nfrastructureView, (F)abricView, (P)erformanceView,
         (T)opContext, (A)dmin, (Q)uit
VIEW:    [I]:H:I:Sw1:Sw1Info
CONTEXT: Name: Device Info, Total Switches: 11
FABRIC:  Top: [Tue Feb 2 07:31:25 2010, Hist], Now: Tue Feb 2 07:51:50 2010
               SWs: 11, HCAs: 3, TCAs: 0, Nodes: 14, SMs: 1
               Links: 48, SWsPorts: 103, HCAsPorts: 4,  TCAsPorts: 0
               HlthErrs: Not Avail,  CommErrs:       297,  Alrms: Not Avail
SWITCH:  Montrd: TRUE, Oprtnl: TRUE, HlthErrs: Not Avail,
         CommErrs: 285, Alrms: Not Avail, Type: n/a, Ports: 24,
         NodeGUID: 0x00066a00d9000479, NodeDesc: i9k479
```

State:	Active	Number of Ports:	24
Node GUID:	0x00066a00de00004d	SysImageGuid:	0x00066a00da000159
Node Type:	SW	PartitionCap:	8
Device ID:	0xb924	Revision Number:	0x01a1
Vendor ID:	0x066a	Class Version:	0x0001
Base Version:	0x0001	LID:	0x0004
LinearFDBCap:	49152	LinearFDBTop:	51
MCFDBCap:	1024	RandomFDBCap:	0
LIDsPerPort:	0	LifeTime:	33 ms
DefPort:	0	DefMCPrimPort:	255
DefMCNotPrimPort:	255	PartEnfCap:	32
PortStateChange:	0	Connected Ports:	16
Capability:	0xf0: IE OE FI FO		

```
SUBMENU: (p)rvPg, Fr(Z), Unfr(z)
```

Figure 4-34. Switch Node Device Information Screen

Switch Node Port Selection Screen

Figure 4-35 is an example of the screen for selecting a port within a specific switch node within the fabric.

```
MENU:     (H)ome, (I)nfrastructureView, (F)abricView, (P)erformanceView,
          (T)opContext, (A)dmin, (Q)uit
VIEW:     [I]:H:I:Sw1:Sw1Info
CONTEXT: Name: Ports Info, Total Switches: 11
FABRIC:  Top: [Tue Feb 2 07:31:25 2010, Hist], Now: Tue Feb 2 07:51:50 2010
SWITCH:  NodeGUID: 0x00066a00d9000479, NodeDesc: i9k479

CID      PORT              ERRORS
 0     Port-00 (Active)        0

CID      PORT              ERRORS   |   CID      PORT              ERRORS
 1     Port-01                  0   |   13    Port-13 (Active)         0
 2     Port-02                  0   |   14    Port-14 (Active)         0
 3     Port-03                  0   |   15    Port-15 (Active)         0
 4     Port-04                  0   |   16    Port-16 (Active)         0
 5     Port-05                  0   |   17    Port-17 (Active)         0
 6     Port-06                  0   |   18    Port-18 (Active)         0
 7     Port-07                  0   |   19    Port-19 (Active)         0
 8     Port-08                  0   |   20    Port-20 (Active)         0
 9     Port-09 (Active)         0   |   21    Port-21 (Active)         0
 10    Port-10                  0   |   22    Port-22 (Active)         0
 11    Port-11 (Active)         0   |   23    Port-23 (Active)         0
 12    Port-12 (Active)         0   |   24    Port-24 (Active)         0

SUBMENU: (p)rvPg, Fr(Z), Unfr(z)
```

Figure 4-35. Switch Node Port Selection Screen

Switch Node Port Information Selection Screen

Figure 4-36 is an example of the screen for selecting the information to display for a port within a switch node within the fabric.

```
MENU:     (H)ome, (I)nfrastructureView, (F)abricView, (P)erformanceView,
          (T)opContext, (A)dmin, (Q)uit
VIEW:     [I]:H:I:Sw1:Sw1Info:P0
CONTEXT: Name: Port-00, Total Switches: 11
FABRIC:  Top: [Tue Feb 2 07:31:25 2010, Hist], Now: Tue Feb 2 07:51:50 2010
SWITCH:  Montrd: TRUE,  Oprtnl: TRUE,  HlthErrs: Not Avail,
          CommErrs: 285, Alrms: Not Avail, Type: n/a,  Ports: 24,
          NodeGUID: 0x00066a00d9000479, NodeDesc: i9k479,
PORT:     PortNo: 0, PortErrs: 0

CID  PORT INFORMATION
 1     General Port Info
 2     Port Statistics Info
 3     Port Attributes Info
 4     Port SL2VL Mapping Info


SUBMENU: (p)rvPg, Fr(Z), Unfr(z)
```

Figure 4-36. Switch Node Port Information Selection Screen

NOTE:

In the present release only the General Port Info and Port Statistics Info are implemented.

Switch Node General Port Information Screen

Figure 4-37 is an example of the screen for viewing general port information, about a specific port within a switch node within the fabric.

```
MENU:    (H)ome, (I)nfrastructureView, (F)abricView, (P)erformanceView,
         (T)opContext, (A)dmin, (Q)uit
VIEW:    [I]:H:I:Sw1:Sw1Info:P0:P0Info
CONTEXT: Name: General Port Info, Total Switches: 11
FABRIC:  Top: [Tue Feb 2 07:31:25 2010, Hist], Now: Tue Feb 2 07:51:50 2010
SWITCH:  NodeGUID: 0x00066a00d9000479, NodeDesc: i9k479

PortNum:   0 LID: 0x0004 GUID: 0x00066a00de00004d
PortState: Active          PhysState: LinkUp   DownDefault: Polling
LID:    0x0004             LMC: 0              Subnet: 0xfe80000000000000
SMLID:  0x000e   SMSL:  0  RespTimeout: 536 ms SubnetTimeout:  536 ms
M_KEY:  0x0000000000000000 Lease:     0 s      Protect: Readonly
MTU:       Active:    2048 Supported:    2048  VL Stall: 0
LinkWidth: Active:      4x Supported:    1-4x  Enabled:      4x
LinkSpeed: Active:   2.5Gb Supported:   2.5Gb  Enabled:   2.5Gb
VLs:       Active:     8+1 Supported:     8+1  HOQLife: 4096 ns
Capability 0x00100848: VDR SIG SL Trap
Violations: M_Key:     0 P_Key:     0 Q_Key:     0
ErrorLimits: Overrun:  0 LocalPhys:  0  DiagCode: 0x0000
P_Key Enforcement: In: Off Out: Off  FilterRaw: In: Off Out: Off

SUBMENU: (p)rvPg, Fr(Z), Unfr(z)
```

Figure 4-37. Switch Node General Port Information Screen

Switch Node Port Statistics Selection Screen

Figure 4-38 is the screen for viewing port statistic information about a specific port within a switch node within the fabric.

```
MENU:     (H)ome, (I)nfrastructureView, (F)abricView, (P)erformanceView,
          (T)opContext, (A)dmin, (Q)uit
VIEW:     [I]:H:I:Sw13:Sw13Info:P0:P0Info
CONTEXT: Name: Port Statistics Info, Total Switches: 11
FABRIC:  Top: [Tue Feb 2 07:31:25 2010, Hist], Now: Tue Feb 2 07:51:50 2010
SWITCH:  Montrd: TRUE,  Oprtnl: TRUE,  HlthErrs: Not Avail,
          CommErrs: 285, Alrms: Not Avail, Type: DDR, Ports: 24,
          NodeGUID: 0x00066a00d9000479, NodeDesc: i9k479,
PORT:     PortNo:  0,  PortErrs:       0

CID  PORT STATISTICS INFORMATION
 1      Port Performance Info
 2      Port Async Events/Traps Info




SUBMENU: (p)rvPg, Fr(Z), Unfr(z)
```

Figure 4-38. Switch Node Port Statistics Selection Screen

NOTE:

In the present release only the Port Performance Info is implemented.

Switch Node Port Performance Screen

Figure 4-39 is the screen for viewing performance information about a specific port within a switch node within the fabric.

```
MENU:    (H)ome, (I)nfrastructureView, (F)abricView, (P)erformanceView,
         (T)opContext, (A)dmin, (Q)uit
VIEW:    [I]:H:I:Sw1:Sw1Info:P19:P19Info:P19StatInfo
CONTEXT: Name: Port Performance Info, Total Switches:     4
FABRIC:  Top: [Sat Apr 3 14:37:06 2010, Hist], Now: Sat Apr 3 14:39:56 2010
SWITCH:  Montrd: TRUE,  Oprtnl: TRUE,  HlthErrs: Not Avail,
         CommErrs:          0,  Alrms: Not Avail,  Type: n/a,  Ports: 24,
         NodeGUID: 0x00066a00060008bc, NodeDesc: SilverStorm 9040 GUID=0x
PMA PORT PERFORMANCE TRANSMIT [PA]
   Xmit Data:                   4889 MB (1281863304 Quads)
   Xmit Pkts:               17803657
PMA PORT PERFORMANCE RECEIVE [PA]
   Rcv Data:                    9230 MB (2419802026 Quads)
   Rcv Pkts:                33608385

PMA PORT ERRORS [PA]
   Symbol Errors:                   0   Link Error Recovery:            0
   Link Downed:                     0   Port Rcv Errors:                0
   Port Rcv Rmt Phys Err:           0   Port Rcv Sw Relay Err:         48
   Port Xmit Discards:              0   Port Xmit Constraint:           0
   Port Rcv Constraint:             0   Local Link Integrity:           0
   Exc. Buffer Overrun:             0   VL15 Dropped:                   0
SUBMENU: (p)rvPg, Fr(Z), Unfr(z)
```

Figure 4-39. Switch Node Port Performance Screen

Channel Adapter (CA) Screens

When the user selects the CAs category from the main screen of the Infrastructure View (Refer to "Submenu Segment" on page 4-6), screens are displayed to enable the user to drill-down to a specific channel adapter of interest. The order in which these screens are displayed will depend upon the number of channel adapters found within the fabric.

NOTE:

If a given Server or IO Device contains multiple Channel Adapters (CAs), each will be show separately and can be accessed independently in the screens which follow.

CA Selection Screen (26+ CAs)

If there are 26 or more CAs found within the fabric, Figure 4-40 is an example of the screen that will be displayed first.

```
MENU:    (H)ome, (I)nfrastructureView, (F)abricView, (P)erformanceView,
         (T)opContext, (A)dmin, (Q)uit
VIEW:    [I]:H:I
CONTEXT: Name: CAs, Total CAs: 3,  Alrms: Not Avail
FABRIC:  Top: [Tue Feb 2 07:31:25 2010, Hist], Now: Tue Feb 2 07:51:50 2010
          SWs: 11, HCAs: 3, TCAs: 0, Nodes: 14, SMs: 1
          Links: 48, SWsPorts: 103, HCAsPorts: 4,  TCAsPorts: 0
          HlthErrs: Not Avail, CommErrs: 297, Alrms: Not Avail
```

CID	CAs			ERRORS		CID	CAs			ERRORS
1	1	-	25	0	|	11	251	-	275	0
2	26	-	50	0	|	12	276	-	300	0
3	51	-	75	0	|	13	301	-	325	0
4	76	-	100	0	|	14	326	-	350	0
5	101	-	125	0	|	15	351	-	375	0
6	126	-	150	0	|	16	376	-	400	0
7	151	-	175	0	|	17	401	-	425	0
8	176	-	200	0	|	18	426	-	450	0
9	201	-	225	0	|	19	451	-	475	0
10	226	-	250	0	|	20	476	-	500	0

```
SUBMENU: (p)rvPg, Fr(z), Unfr(z)
```

Figure 4-40. CA Selection Screen (26+ CAs)

CA Selection Screen (1-25 CAs)

After selecting a block of 25 CAs or if there are between 1 to 25 CAs found within the fabric, Figure 4-41 is an example of the screen that will be displayed.

```
MENU:    (H)ome, (I)nfrastructureView, (F)abricView, (P)erformanceView,
         (T)opContext, (A)dmin, (Q)uit
VIEW:    [I]:H:I
CONTEXT: Name: CAs 1 - 25, Total CAs: 13, Alrms: Not Avail
FABRIC:  Top: [Tue Feb 2 07:31:25 2010, Hist], Now: Tue Feb 2 07:51:50 2010
          SWs: 11, HCAs: 3, TCAs: 0, Nodes: 14, SMs: 1
          Links: 48, SWsPorts: 103, HCAsPorts: 4,  TCAsPorts: 0
          HlthErrs: Not Avail, CommErrs: 297, Alrms: Not Avail
```

CID	CA	TYPE	PORTS	ERRORS	NODE DESC
1	0x0002c9020025a678	DDR	2	0	mindy2 HCA-1
2	0x00066a0098000405	DDR	2	0	endrin
3	0x00066a009800413e	DDR	2	0	cuda
4	0x00066a009800447b	DDR	2	0	duster
5	0x00066a0098006cad	DDR	2	0	InfiniServ
6	0x00066a0098006f74	DDR	2	0	QuickSilver
7	0x00066a0098007b70	DDR	2	0	stewie HCA-1
8	0x00066a10dd000075	DDR	1	0	FVIC in Chassis 0x00066a00da00
9	0x00066a10de00004d	DDR	1	0	EVIC in Chassis 0x00066a00da00
10	0x00066a20dd000075	DDR	1	0	FVIC in Chassis 0x00066a00da00
11	0x00066a20de00004d	DDR	1	0	EVIC in Chassis 0x00066a00da00
12	0x0011750000ff8f4d	DDR	1	0	scooby HCA-1

```
SUBMENU: (p)rvPg, Fr(Z), Unfr(z)
```

Figure 4-41. CA Selection Screen (1-25 CAs)

CA Information Selection Screen

Figure 4-42 is an example of the screen for selecting the information to display for a CA within the fabric.

```
MENU:     (H)ome, (I)nfrastructureView, (F)abricView, (P)erformanceView,
          (T)opContext, (A)dmin, (Q)uit
VIEW:     [I]:H:I:Ca1
CONTEXT: Name: 0x00066a0098007b70, Total CAs: 3
FABRIC:  Top: [Tue Feb 2 07:31:25 2010, Hist], Now: Tue Feb 2 07:51:50 2010
          SWs: 11, HCAs: 3, TCAs: 0, Nodes: 14, SMs: 1
          Links: 48, SWsPorts: 103, HCAsPorts: 4,  TCAsPorts: 0
          HlthErrs: Not Avail, CommErrs: 297, Alrms: Not Avail
CA:       Montrd: TRUE,  Oprtnl: TRUE,  HlthErrs: Not Avail,
          CommErrs:  87,  Alrms: Not Avail,  Type: n/a,  Ports:  2,
          NodeGUID: 0x00066a0098007b70, NodeDesc: stewie HCA-1

CID  NODE INFORMATION
 1     Device Info
 2     Ports Info
 3     Chassis Info
 4     Module Info
 5     Partition Info
 6     Health Info

SUBMENU: (p)rvPg, Fr(Z), Unfr(z)
```

Figure 4-42. CA Information Selection Screen

NOTE:

In the present release only the Device Info and Ports Info Categories are implemented.

CA Device Information Screen

Figure 4-43 is an example of the screen for viewing device specific information for a CA within the fabric.

```
MENU:    (H)ome, (I)nfrastructureView, (F)abricView, (P)erformanceView,
         (T)opContext, (A)dmin, (Q)uit
VIEW:    [I]:H:I:Ca1:CaInfo
CONTEXT: Name: 0x00066a0098007b70, Total CAs: 3
FABRIC:  Top: [Tue Feb 2 07:31:25 2010, Hist], Now: Tue Feb 2 07:51:50 2010
          SWs: 11, HCAs: 3, TCAs: 0, Nodes: 14, SMs: 1
          Links: 48, SWsPorts: 103, HCAsPorts: 4,  TCAsPorts: 0
          HlthErrs: Not Avail, CommErrs: 297, Alrms: Not Avail
CA:      NodeGUID: 0x00066a0098007b70, NodeDesc: stewie HCA-1
```

State:	Active	Number of Ports:	2
Node GUID:	0x0002c9020025a678	SysImageGuid:	0x0002c9020025a67b
Node Type:	CA	PartitionCap:	128
Device ID:	0x634a	Revision Number:	0x00a0
Vendor ID:	0x02c9	Class Version:	0x0001
Base Version:	0x0001	Connected Ports:	0x0001

```
SUBMENU: (p)rvPg, Fr(Z), Unfr(z)
```

Figure 4-43. CA Device Information Screen

CA Port Selection Screen

Figure 4-44 is an example of the screen for selecting a port within a specific CA within the fabric.

```
MENU:     (H)ome, (I)nfrastructureView, (F)abricView, (P)erformanceView,
          (T)opContext, (A)dmin, (Q)uit
VIEW:     [I]:H:I:Ca1:Ca1Info
CONTEXT: Name: Ports Info, Total CAs: 3
FABRIC:  Top: [Tue Feb 2 07:31:25 2010, Hist], Now: Tue Feb 2 07:51:50 2010
CA:      NodeGUID: 0x00066a0098007b70, NodeDesc: stewie HCA-1

CID      PORT             ERRORS
 0     Port-00                  0

CID      PORT             ERRORS  |  CID      PORT             ERRORS
 1     Port-01 (Active)         0  |  13    Port-13                0
 2     Port-02                  0  |  14    Port-14                0
 3     Port-03                  0  |  15    Port-15                0
 4     Port-04                  0  |  16    Port-16                0
 5     Port-05                  0  |  17    Port-17                0
 6     Port-06                  0  |  18    Port-18                0
 7     Port-07                  0  |  19    Port-19                0
 8     Port-08                  0  |  20    Port-20                0
 9     Port-09                  0  |  21    Port-21                0
 10    Port-10                  0  |  22    Port-22                0
 11    Port-11                  0  |  23    Port-23                0
 12    Port-12                  0  |  24    Port-24                0

SUBMENU: (p)rvPg, Fr(Z), Unfr(z)
```

Figure 4-44. CA Port Selection Screen

CA Port Information Selection Screen

Figure 4-45 is an example of the screen for selecting the information to be displayed for a port within a CA within the fabric

```
MENU:     (H)ome, (I)nfrastructureView, (F)abricView, (P)erformanceView,
          (T)opContext, (A)dmin, (Q)uit
VIEW:     [I]:H:I:Ca1:Ca1Info:P1
CONTEXT: Name: Ports Info, Total CAs: 3
FABRIC:  Top: [Tue Feb 2 07:31:25 2010, Hist], Now: Tue Feb 2 07:51:50 2010
          SWs: 11, HCAs: 3, TCAs: 0, Nodes: 14, SMs: 1
          Links: 48, SWsPorts: 103, HCAsPorts: 4,  TCAsPorts: 0
          HlthErrs: Not Avail, CommErrs: 297, Alrms: Not Avail
CA:       Montrd: TRUE,  Oprtnl: TRUE,  HlthErrs: Not Avail,
          CommErrs:  87,  Alrms: Not Avail,  Type: n/a,  Ports:  2,
          NodeGUID: 0x00066a0098007b70, NodeDesc: stewie HCA-1
PORT:     PortNo: 1, PortErrs: 0

CID  PORT INFORMATION
 1      General Port Info
 2      Port Statistics Info
 3      Port Attributes Info
 4      Port SL2VL Mapping Info

SUBMENU: (p)rvPg, Fr(Z), Unfr(z)
```

Figure 4-45. CA Port Information Selection Screen

NOTE:

In the present release only the General Port Info and Port Statistics Info are implemented.

Port Element

The following are shown for a port, within a node:

- PortNo — port number of the port.
- PortErrs — number of errors observed on the port.

CA Port General Information Screen

Figure 4-46 is an example of the screen for viewing general port information for a specific port within a CA within the fabric.

```
MENU:    (H)ome, (I)nfrastructureView, (F)abricView, (P)erformanceView,
         (T)opContext, (A)dmin, (Q)uit
VIEW:    [I]:H:I:Ca1:Ca1Info:P1:P1Info
CONTEXT: Name: General Port Info, Total CAs: 3
FABRIC:  Top: [Tue Feb 2 07:31:25 2010, Hist], Now: Tue Feb 2 07:51:50 2010
          SWs: 11, HCAs: 3, TCAs: 0, Nodes: 14, SMs: 1
          Links: 48, SWsPorts: 103, HCAsPorts: 4,  TCAsPorts: 0
          HlthErrs: Not Avail, CommErrs: 297, Alrms: Not Avail
CA:      NodeGUID: 0x00066a0098007b70, NodeDesc: stewie HCA-1

PortNum:   1 LID: 0x0028 GUID: 0x0002c9020025a679
PortState: Active          PhysState: LinkUp   DownDefault: Polling
LID:    0x0028             LMC: 1              Subnet: 0xfe80000000000000
SMLID:  0x000e   SMSL:  0  RespTimeout: 268 ms SubnetTimeout:  536 ms
M_KEY:  0x0000000000000000 Lease:     0 s      Protect: Readonly
MTU:       Active:    2048 Supported:    2048  VL Stall: 0
LinkWidth: Active:      4x Supported:    1-4x  Enabled:    1-4x
LinkSpeed: Active:   5.0Gb Supported: 2.5-5Gb  Enabled: 2.5-5Gb
VLs:       Active:     8+1 Supported:     8+1  HOQLife: 4096 ns
Capability 0x02510868: CR CN VDR CM SIG SL APM Trap
Violations: M_Key:     0 P_Key:     0 Q_Key:     0
ErrorLimits: Overrun: 15 LocalPhys: 15  DiagCode: 0x0000
P_Key Enforcement: In: Off Out: Off  FilterRaw: In: Off Out: Off
Neighbor:  0x0002c9020025a678   1 CA mindy2 HCA-1

SUBMENU: (p)rvPg, Fr(Z), Unfr(z)
```

Figure 4-46. CA Port General Information Screen

CA Port Statistics Selection Screen

Figure 4-47 is an example of the screen for viewing port statistic information for a specific port within a CA within the fabric

```
MENU:     (H)ome, (I)nfrastructureView, (F)abricView, (P)erformanceView,
          (T)opContext, (A)dmin, (Q)uit
VIEW:     [I]:H:I:Ca1:Ca1Info:P1:P1Info
CONTEXT: Name: Port Statistics Info, Total CAs: 3
FABRIC:  Top: [Tue Feb 2 07:31:25 2010, Hist], Now: Tue Feb 2 07:51:50 2010
          SWs: 11, HCAs: 3, TCAs: 0, Nodes: 14, SMs: 1
          Links: 48, SWsPorts: 103, HCAsPorts: 4,  TCAsPorts: 0
          HlthErrs: Not Avail, CommErrs: 297, Alrms: Not Avail
CA:       Montrd: TRUE,  Oprtnl: TRUE,  HlthErrs: Not Avail,
          CommErrs:  87,  Alrms: Not Avail,  Type: n/a,  Ports:  2,
          NodeGUID: 0x00066a0098007b70, NodeDesc: stewie HCA-1
PORT:     PortNo: 1, PortErrs: 0

CID  PORT STATISTICS INFORMATION
 1      Port Performance Info
 2      Port Async Events/Traps Info

SUBMENU: (p)rvPg, Fr(Z), Unfr(z)
```

Figure 4-47. CA Port Statistics Selection Screen

NOTE:

In the present release only the Port Performance Info is implemented.

CA Port Performance Screen

Figure 4-48 is an example of the screen for viewing performance information for a specific port within a CA within the fabric.

```
MENU:     (H)ome, (I)nfrastructureView, (F)abricView, (P)erformanceView,
          (T)opContext, (A)dmin, (Q)uit
VIEW:     [I]:H:I:Ca1:Ca1Info:P1:P1Info:P1StatInfo
CONTEXT: Name: Port Performance Info, Total CAs:     8
FABRIC:  Top: [Sat Apr 3 14:44:50 2010, Hist], Now: Sat Apr 3 14:52:50 2010
CA:       Montrd: TRUE,  Oprtnl: TRUE,  HlthErrs: Not Avail,
          CommErrs:          0,  Alrms: Not Avail,  Type: n/a,  Ports:  2,
          NodeGUID: 0x00066a0098007b5e, NodeDesc: compute0004 HCA-1
PMA PORT PERFORMANCE TRANSMIT [PA]
   Xmit Data:                    86 MB (22798588 Quads)
   Xmit Pkts:                 69962
PMA PORT PERFORMANCE RECEIVE [PA]
   Rcv Data:                   167 MB (44018464 Quads)
   Rcv Pkts:                 110902

PMA PORT ERRORS [PA]
   Symbol Errors:                  0   Link Error Recovery:            0
   Link Downed:                    0   Port Rcv Errors:                0
   Port Rcv Rmt Phys Err:          0   Port Rcv Sw Relay Err:          0
   Port Xmit Discards:             2   Port Xmit Constraint:           0
   Port Rcv Constraint:            0   Local Link Integrity:           0
   Exc. Buffer Overrun:            0   VL15 Dropped:                   2
SUBMENU: (p)rvPg, Fr(Z), Unfr(z)
```

Figure 4-48. CA Port Performance Screen

Fabric View Sub-Screens

Link Screens

When a user selects the Links category from the Fabric View main screen (“Submenu Segment” on page 4-6), the user is able to drill-down to a specific communication link of interest. The order in which these screens are displayed will depend upon the number of links found within the fabric.

Link Category Selection Screen

Figure 4-49 is an example of the screen for selecting the category of links to view.

```
MENU:     (H)ome, (I)nfrastructureView, (F)abricView, (P)erformanceView,
          (T)opContext, (A)dmin, (Q)uit
VIEW:     [F]:H:F
CONTEXT:  Name: Links
FABRIC:   Top: [Wed Sep 21 14:11:42 2011, Hist], Now: Wed Sep 21 14:13:02 2011
          SWs:       4,  HCAs:       8,  TCAs:       0,  Nodes:      12,  SMs: 2
          Links:     21,  SWsPorts:     38,  HCAsPorts:     8,  TCAsPorts:     0
          HlthErrs: Not Avail,  CommErrs:      65631,  Alrms: Not Avail

                              FABRIC LINK INFORMATION

CID    CATEGORY          TOTAL  MONTRD  OPRTNL  HLTH-ERRS  COMM-ERRS       ALRMS
1    All Links             21      21      21          0      65631  Not Avail
2    External Links         9       9       9          0      65595  Not Avail
3    Internal Links        12      12      12          0         36  Not Avail
4    Error Links            0       0       0          0          0  Not Avail
5    Slow Links             0       0       0          0          0  Not Avail
6    TopTalker Links        9       9       9          0      65595  Not Avail

SUBMENU: (p)rvPg, Fr(Z), Unfr(z)
```

Figure 4-49. Link Category Selection Screen

Link Selection Screen (24000+ Links)

If there are 24000 or more links found within the fabric, Figure 4-50 is an example of the screen that will be displayed first.

```
MENU:    (H)ome, (I)nfrastructureView, (F)abricView, (P)erformanceView,
         (T)opContext, (A)dmin, (Q)uit
VIEW:    [F]:H:F:All
CONTEXT: Name: All Links, Total links: 25007,
         Alrms: Not Avail
FABRIC:  Top: [Tue Feb 2 07:31:25 2010, Hist], Now: Tue Feb 2 07:51:50 2010
           SWs: 11, HCAs: 3, TCAs: 0, Nodes: 14, SMs: 1
           Links: 48, SWsPorts: 103, HCAsPorts: 4, TCAsPorts: 0
           HlthErrs: Not Avail, CommErrs: 0, Alrms: Not Avail
```

CID	LINKS	ERRORS	CID	LINKS	ERRORS
1	1 - 23999	0	11	240000 - 263999	0
2	24000 - 47999	0	12	264000 - 287999	0
3	48000 - 71999	0	13	288000 - 311999	0
4	72000 - 95999	0	14	312000 - 335999	0
5	96000 - 119999	0	15	336000 - 359999	0
6	120000 - 143999	0	16	360000 - 383999	0
7	144000 - 167999	0	17	384000 - 407999	0
8	168000 - 191999	0	18	408000 - 431999	0
9	192000 - 215999	0	19	432000 - 455999	0
10	216000 - 239999	0	20	456000 - 480000	0

```
SUBMENU: (p)rvPg, Fr(Z), Unfr(z)
```

Figure 4-50. Link Selection Screen (24000+ Links)

Link Selection Screen (1200-24000 Links)

After selecting a block of 24000 Links or if there are between 1200 to 24000 Links found within the fabric, Figure 4-51 is an example of the screen that will be displayed.

```
MENU:    (H)ome, (I)nfrastructureView, (F)abricView, (P)erformanceView,
         (T)opContext, (A)dmin, (Q)uit
VIEW:    [F]:H:F:All:Link1-23999
CONTEXT: Name: Links 1 - 23999, Total links: 25007,
         Alrms: Not Avail
FABRIC:  Top: [Tue Feb 2 07:31:25 2010, Hist], Now: Tue Feb 2 07:51:50 2010
          SWs: 11, HCAs: 3, TCAs: 0, Nodes: 14, SMs: 1
          Links: 48, SWsPorts: 103, HCAsPorts: 4, TCAsPorts: 0
          HlthErrs: Not Avail, CommErrs: 0, Alrms: Not Avail
```

CID	LINKS	ERRORS	CID	LINKS	ERRORS
1	1 - 1200	0	11	12001 - 13200	0
2	1201 - 2400	0	12	13201 - 14400	0
3	2401 - 3600	0	13	14401 - 15600	0
4	3601 - 4800	0	14	15601 - 16800	0
5	4801 - 6000	0	15	16801 - 18000	0
6	6001 - 7200	0	16	18001 - 19200	0
7	7201 - 8400	0	17	19201 - 20400	0
8	8401 - 9600	0	18	20401 - 21600	0
9	9601 - 10800	0	19	21601 - 22800	0
10	10801 - 12000	0	20	22801 - 24000	0

```
SUBMENU: (p)rvPg, Fr(Z), Unfr(z)
```

Figure 4-51. Link Selection Screen (1200-24000 Links)

Link Selection Screen (60-1200 Links)

After selecting a block of 1200 Links or if there are between 60 to 1200 Links found within the fabric, Figure 4-52 is an example of the screen that will be displayed.

```
MENU:    (H)ome, (I)nfrastructureView, (F)abricView, (P)erformanceView,
         (T)opContext, (A)dmin, (Q)uit
VIEW:    [F]:H:F:All:Link1-23999:Link1-1200
CONTEXT: Name: Links 1 - 1200, Total links: 25007,
         Alrms: Not Avail
FABRIC:  Top: [Tue Feb 2 07:31:25 2010, Hist], Now: Tue Feb 2 07:51:50 2010
          SWs: 11, HCAs: 3, TCAs: 0, Nodes: 14, SMs: 1
          Links: 48, SWsPorts: 103, HCAsPorts: 4, TCAsPorts: 0
          HlthErrs: Not Avail, CommErrs: 0, Alrms: Not Avail
```

CID	LINKS			ERRORS		CID	LINKS			ERRORS
1	1	-	60	0	|	11	601	-	660	0
2	61	-	120	0	|	12	661	-	720	0
3	121	-	180	0	|	13	721	-	780	0
4	181	-	240	0	|	14	781	-	840	0
5	241	-	300	0	|	15	841	-	900	0
6	301	-	360	0	|	16	901	-	960	0
7	361	-	420	0	|	17	961	-	1020	0
8	421	-	480	0	|	18	1021	-	1080	0
9	481	-	540	0	|	19	1081	-	1140	0
10	541	-	600	0	|	20	1141	-	1200	0

```
SUBMENU: (p)rvPg, Fr(Z), Unfr(z)
```

Figure 4-52. Link Selection Screen (60-1200 Links)

Link Selection Screen (1-60 Links)

After selecting a block of 60 Links or if there are between 1 to 60 Links found within the fabric, Figure 4-53 is an example of the screen that will be displayed.

```
MENU:    (H)ome, (I)nfrastructureView, (F)abricView, (P)erformanceView,
         (T)opContext, (A)dmin, (Q)uit
VIEW:    [F]:H:F:All:Link1-23999:Link1-1200:Link1-60
CONTEXT: Name: Links 1 - 60, Total links: 25007,
         Alrms: Not Avail
FABRIC:  Top: [Tue Feb 2 07:31:25 2010, Hist], Now: Tue Feb 2 07:51:50 2010
           SWs: 11, HCAs: 3, TCAs: 0, Nodes: 14, SMs: 1
           Links: 48, SWsPorts: 103, HCAsPorts: 4, TCAsPorts: 0
           HlthErrs: Not Avail, CommErrs: 0, Alrms: Not Avail
```

CID	RATE	LINK NODE	TYPE	PORT	ERRORS	NODE DESC
1	20g	0x0002c9020025a678	CA	1	0	mindy2 HCA-1
		0x00066a0007000e6d	SW	4	0	SilverStorm 9080 GUID=
2	20g	0x00066a000600025a	SW	1	0	SilverStorm 9080 GUID=
		0x00066a0007000e6d	SW	19	0	SilverStorm 9080 GUID=
3	20g	0x00066a000600025a	SW	2	0	SilverStorm 9080 GUID=
		0x00066a0007000e6d	SW	20	0	SilverStorm 9080 GUID=
4	20g	0x00066a000600025a	SW	3	0	SilverStorm 9080 GUID=
		0x00066a0007000e6d	SW	21	0	SilverStorm 9080 GUID=
5	20g	0x00066a000600025a	SW	4	0	SilverStorm 9080 GUID=
		0x00066a00de00004d	SW	22	0	SilverStorm 9080 GUID=
6	20g	0x00066a000600025a	SW	5	0	SilverStorm 9080 GUID=
		0x00066a00de00004d	SW	23	0	SilverStorm 9080 GUID=

```
SUBMENU: (p)rvPg, Scrl(d)wn, Fr(Z), Unfr(z)
```

Figure 4-53. Link Selection Screen (1-60 Links)

Link Information Selection Screen

Figure 4-54 is an example of the screen for selecting the information to display or a link within the fabric.

```
MENU:     (H)ome, (I)nfrastructureView, (F)abricView, (P)erformanceView,
          (T)opContext, (A)dmin, (Q)uit
VIEW:     [F]:H:F:All:Link1-23999:Link1-1200:Link1-60:Link1
CONTEXT: Name: Link1, Total links:   25007
FABRIC:  Top: [Tue Feb 2 07:31:25 2010, Hist], Now: Tue Feb 2 07:51:50 2010
           SWs: 11, HCAs: 3, TCAs: 0, Nodes: 14, SMs: 1
           Links: 48, SWsPorts: 103, HCAsPorts: 4, TCAsPorts: 0
           HlthErrs: Not Avail, CommErrs: 0, Alrms: Not Avail
LINK:     LnkNo:       1, LnkTyp: External,
          EndNode1: 0x00066a0098007b70, PortNo: 1, NodeDesc: stewie HCA-1
          EndNode2: 0x00066a00d9000479, PortNo: 18, NodeDesc: i9k479
          LinkWidth: Active:   4x, Supported:    1-4x, Enabled:    1-4x,
          LnkSpd: Active:   5.0Gb, Supported: 2.5-5Gb, Enabled: 2.5-5Gb

CID  LINK INFORMATION    ERRORS
 1   End-Node 1 Info          0
 2   End-Node 2 Info          0
 3   End-Port 1 Info          0
 4   End-Port 2 Info          0

SUBMENU: (p)rvPg, Fr(Z), Unfr(z)
```

Figure 4-54. Link Information Selection Screen (60-1200 Links)

NOTE:

A link consists of two connected ports between two end nodes (Switch, CA, or router). In this screen the user may select to drill down into either port or either end node.

Link End-Node Information Selection Screen

Figure 4-55 is an example of the screen for selecting the information to display for an end-node of a specific link within the fabric

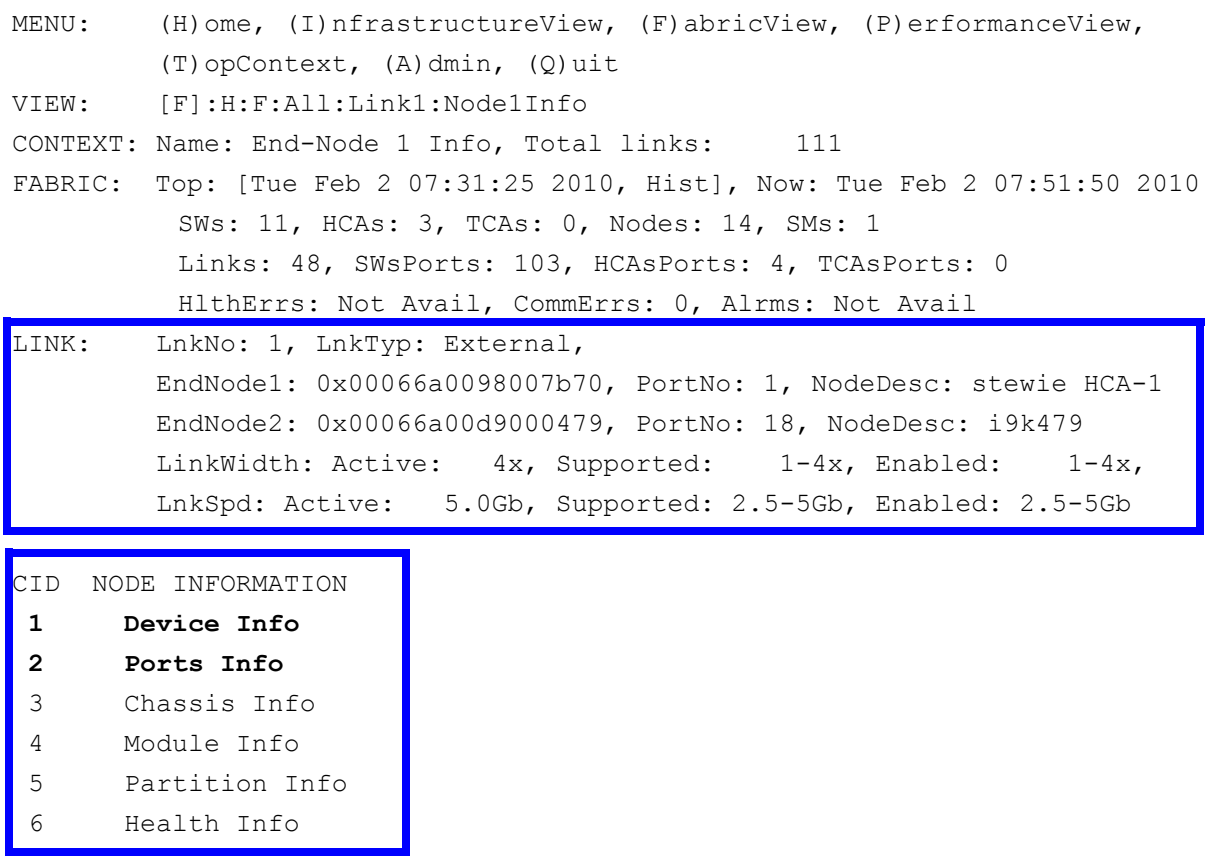
MENU: (H)ome, (I)nfrastructureView, (F)abricView, (P)erformanceView,
(T)opContext, (A)dmin, (Q)uit
VIEW: [F]:H:F:All:Link1:Node1Info
CONTEXT: Name: End-Node 1 Info, Total links: 111
FABRIC: Top: [Tue Feb 2 07:31:25 2010, Hist], Now: Tue Feb 2 07:51:50 2010
SWs: 11, HCAs: 3, TCAs: 0, Nodes: 14, SMs: 1
Links: 48, SWsPorts: 103, HCAsPorts: 4, TCAsPorts: 0
HlthErrs: Not Avail, CommErrs: 0, Alrms: Not Avail
LINK: LnkNo: 1, LnkTyp: External,
EndNode1: 0x00066a0098007b70, PortNo: 1, NodeDesc: stewie HCA-1
EndNode2: 0x00066a00d9000479, PortNo: 18, NodeDesc: i9k479
LinkWidth: Active: 4x, Supported: 1-4x, Enabled: 1-4x,
LnkSpd: Active: 5.0Gb, Supported: 2.5-5Gb, Enabled: 2.5-5Gb
CID NODE INFORMATION
1 Device Info
2 Ports Info
3 Chassis Info
4 Module Info
5 Partition Info
6 Health Info
SUBMENU: (p)rvPg, Fr(Z), Unfr(z)

Figure 4-55. Link End-Node Information Selection Screen

NOTE:

In the present release only the Device Info and Ports Info Categories are implemented.

Selections on this screen will display Device Information screen described in “CA Device Information Screen” on page 4-29 or Port Information Selection screen described in “CA Port Information Selection Screen” on page 4-31.

Link Element

A link is an established connection between two ports (cable or backplane/internal). The following are shown in Figure 4-55:

- LnkNo — numeric identifier associated with the link.
- LnkTyp — type of link: Internal or External.
- EndNode1/2 — These two fields lists the Node GUIDs of the two nodes connected through the link.
- NodeDesc — lists the Node Description of the node.
- PortNo — lists the port number on the node which is used by the link.
- LinkWidth — lists the Active, Supported, and Enabled widths of the link.
- LnkSpd — lists the Active, Supported, and Enabled speeds of the link.

Link End-Port Information Selection Screen

Figure 4-56 is an example of the screen for selecting the information to display for an end-port of a specific link within the fabric

```
MENU:     (H)ome, (I)nfrastructureView, (F)abricView, (P)erformanceView,
          (T)opContext, (A)dmin, (Q)uit
VIEW:     [F]:H:F:All:Link1:Node1Info:Ca1Info:P1
CONTEXT: Name: End-Port 1 Info, Total links:     111
FABRIC:  Top: [Tue Feb 2 07:31:25 2010, Hist], Now: Tue Feb 2 07:51:50 2010
           SWs: 11, HCAs: 3, TCAs: 0, Nodes: 14, SMs: 1
           Links: 48, SWsPorts: 103, HCAsPorts: 4, TCAsPorts: 0
           HlthErrs: Not Avail, CommErrs: 0, Alrms: Not Avail
CA:       Montrd: TRUE,  Oprtnl: TRUE,  HlthErrs: Not Avail,
          CommErrs: 8,  Alrms: Not Avail,  Type: n/a,  Ports:  2,
          NodeGUID: 0x00066a0098007b70, NodeDesc: stewie HCA-1
LINK:     LnkNo: 1, LnkTyp: External,
          EndNode1: 0x00066a0098007b70, PortNo: 1, NodeDesc: stewie HCA-1
          EndNode2: 0x00066a00d9000479, PortNo: 18, NodeDesc: i9k479
          LinkWidth: Active:   4x, Supported:    1-4x, Enabled:    1-4x,
          LnkSpd: Active:   5.0Gb, Supported: 2.5-5Gb, Enabled: 2.5-5Gb
PORT:     PortNo:  1,  PortErrs:       0

CID  PORT INFORMATION
 1      General Port Info
 2      Port Statistics Info
 3      Port Attributes Info
 4      Port SL2VL Mapping Info

SUBMENU: (p)rvPg, Fr(Z), Unfr(z)
```

Figure 4-56. Link End-Port Information Selection Screen

NOTE:

In the present release only the General Port Info and Port Statistics Info are implemented.

Selections on this screen will display General Port Information described in “CA Port General Information Screen” on page 4-32 or Port Statistics Selection screen described in “CA Port Statistics Selection Screen” on page 4-33

Slow Link Selection Screen

Figure 4-57 is an example of the screen for selecting which types of slow link performance to analyze.

```
MENU:     (H)ome, (I)nfrastructureView, (F)abricView, (P)erformanceView,
          (T)opContext, (A)dmin, (Q)uit
VIEW:     [F]:H:F:Slow
CONTEXT: Name: Slow Links, Total links:  25007
FABRIC:  Top: [Tue Feb 2 07:31:25 2010, Hist], Now: Tue Feb 2 07:51:50 2010
           SWs: 11, HCAs: 3, TCAs: 0, Nodes: 14, SMs: 1
           Links: 48, SWsPorts: 103, HCAsPorts: 4, TCAsPorts: 0
           HlthErrs: Not Avail, CommErrs: 0, Alrms: Not Avail
```

SLOW LINK INFORMATION

CID	CATEGORY	TOTAL	ERRS
1	Links running slower than expected speed	0	0
2	Links running slower than supported speed	0	0
3	Links running slower than faster port	5	0
4	Links configured slower than supported speed	0	0
5	Links connected with mismatched supported speeds	5	0

```
SUBMENU: (p)rvPg, Fr(Z), Unfr(z)
```

Figure 4-57. Slow Link Selection Screen

Selections on this screen will display Link screens as shown in “Link Selection Screen (24000+ Links)” on page 4-36, “Link Selection Screen (1200-24000 Links)” on page 4-37, “Link Selection Screen (60-1200 Links)” on page 4-38, or “Link Selection Screen (1-60 Links)” on page 4-39

SM Screens

SM Selection Screen

Figure 4-58 is an example of the initial screen for selecting a SM within the fabric.

```
MENU:    (H)ome, (I)nfrastructureView, (F)abricView, (P)erformanceView,
         (T)opContext, (A)dmin, (Q)uit
VIEW:    [F]:H:F
CONTEXT: Name: SMs
FABRIC:  Top: [Tue Feb 2 07:31:25 2010, Hist], Now: Tue Feb 2 07:51:50 2010
          SWs: 11, HCAs: 3, TCAs: 0, Nodes: 14, SMs: 1
          Links: 48, SWsPorts: 103, HCAsPorts: 4, TCAsPorts: 0
          HlthErrs: Not Avail, CommErrs: 0, Alrms: Not Avail

CID      TYPE           NODE GUID                  NAME
1     Master       0x00066a000600025a  SilverStorm 9080 GUID=
2     Standby      0x00066a00060002f7  SilverStorm 9080 GUID=
3     Standby      0x0011750000ffd66c  strawberry HCA-1

SUBMENU: (p)rvPg, Fr(Z), Unfr(z)
```

Figure 4-58. SM Selection Screen

SM Detailed Information Screen

Figure 4-59 is an example of the screen showing detailed information about an SM within the fabric.

```
MENU:     (H)ome, (I)nfrastructureView, (F)abricView, (P)erformanceView,
          (T)opContext, (A)dmin, (Q)uit
VIEW:     [F]:H:F:Sm1
CONTEXT: Name: Sm1
FABRIC:  Top: [Tue Feb 2 07:31:25 2010, Hist], Now: Tue Feb 2 07:51:50 2010
           SWs: 11, HCAs: 3, TCAs: 0, Nodes: 14, SMs: 1
           Links: 48, SWsPorts: 103, HCAsPorts: 4, TCAsPorts: 0
           HlthErrs: Not Avail, CommErrs: 0, Alrms: Not Avail

State: Master
Name: SilverStorm 9080 GUID=0x00066a
NodeGUID: 0x00066a000600025a
Type: SW
PortNum:   0
LID: 0x000e
PortGUID: 0x00066a000600025a
SM_Key: 0x0000000000000000 Priority:   0 ActCount: 0x0025e41d

SUBMENU: (p)rvPg, Fr(Z), Unfr(z)
```

Figure 4-59. SM Detailed Information Screen

Performance View Sub-Screens

Bandwidth Utilization Screens

When a user selects the **(G)rp<1-4><u>** sub-menu selection from the Main screen ("Submenu Segment" on page 4-6), the user is able to drill-down to the utilization statistics for a specific group of ports of interest.

Switch Group Bandwidth Utilization Selection Screen

Figure 4-60 is an example of the screen for selecting the utilization category of the Switch group to view.

```
MENU:    (H)ome, (I)nfrastructureView, (F)abricView, (A)dmin, (Q)uit
VIEW:    [P]:H
CONTEXT: Name: Low BW Stats
FABRIC:  Top: [Tue Feb 2 07:31:25 2010, Hist], Now: Tue Feb 2 07:51:50 2010
PERF:   GrpName: SWs, GrpNumPrts: 94, LstNumPrts: 10,
        LstMaxNumPrts: 10, NodesFailed: 0, NodesSkipped: 0,
                  PortsFailed: 0, PortsSkipped: 9
```

LOW BW STATS PORTS LISTING

CID	PORT NO	LID	VAL	Node GUID	NODE
1	13	0x0003	0.0	0x00066a00d9000479	i9k479
	9	0x0400	0.0	0x00066a0007000e6d	SilverStorm 9080 GUID=
2	18	0x0003	0.0	0x00066a00d9000479	i9k479
	1	0x0100	0.0	0x00066a0098007b70	stewie HCA-1
3	20	0x0003	0.0	0x00066a00d9000479	i9k479
	1	0x0f00	0.0	0x0002c9020025a678	mindy2 HCA-1
4	7	0x0004	0.0	0x00066a0007000e6d	SilverStorm 9080 GUID=
	2	0x0200	0.0	0x00066a0098007b70	stewie HCA-1
5	13	0x0004	0.0	0x00066a0007000e6d	SilverStorm 9080 GUID=
	10	0x0500	0.0	0x00066a100600025a	SilverStorm 9080 GUID=

```
SUBMENU: (+), (p)rvPg, (u)til<h|l>, Ls(t)<n>, Im(g)Cfg
```

Figure 4-60. Switch Group Bandwidth Utilization Selection Screen

Low Bandwidth Utilization Selection Screen

After selecting the **(u)til<l>** sub-menu selection, for ports associated with links with a low bandwidth utilization, a list of links is displayed to the user. Figure 4-61 is an example of the screen that will be displayed.

```
MENU:     (H)ome, (I)nfrastructureView, (F)abricView, (P)erformanceView,
          (T)opContext, (A)dmin, (Q)uit
VIEW:     [P]:H:LowStats
CONTEXT: Name: Performance Group BW View
FABRIC:  Top: [Tue Feb 2 07:31:25 2010, Hist], Now: Tue Feb 2 07:51:50 2010
PERF:     GrpName: SWs, GrpNumPrts: 94, LstNumPrts: 10, LstMaxNumPrts: 10

                        SWs GROUP BW STATS INFORMATION

Int  TotMBps  AvgMBps  MinMBps  MaxMBps  TotKPps  AvgKPps  MinKPps  MaxKPps
       0        0        0        0        0        0        0        0
  Buckt  0+%  10+%   20+%   30+%   40+%   50+%   60+%   70+%   80+%   90+%
         90    0      0      0      0      0      0      0      0      0

Snd  TotMBps  AvgMBps  MinMBps  MaxMBps  TotKPps  AvgKPps  MinKPps  MaxKPps
       0        0        0        0        0        0        0        0
  Buckt  0+%  10+%   20+%   30+%   40+%   50+%   60+%   70+%   80+%   90+%
          4    0      0      0      0      0      0      0      0      0

Rcv  TotMBps  AvgMBps  MinMBps  MaxMBps  TotKPps  AvgKPps  MinKPps  MaxKPps
       0        0        0        0        0        0        0        0
  Buckt  0+%  10+%   20+%   30+%   40+%   50+%   60+%   70+%   80+%   90+%
          4    0      0      0      0      0      0      0      0      0

SUBMENU: (+), (p)rvPg, (u)til<h|l>, Ls(t)<n>, Im(g)Cfg
```

Figure 4-61. Low Bandwidth Utilization Selection Screen

Error Condition Screens

When a user selects the **(G)rp<1-4><e>** sub-menu selection from the Main screen ("Submenu Segment" on page 4-6), the user is able to drill-down to the error condition statistics for a specific group of ports of interest.

Switch Group Error Condition Selection Screen

Figure 4-62 is an example of the screen for selecting the error category of the Switch group to view.

```
MENU:    (H)ome, (I)nfrastructureView, (F)abricView, (A)dmin, (Q)uit
VIEW:    [P]:H
CONTEXT: Name: Performance Group Errors View
FABRIC:  Img: [Sat Apr 3 14:29:23 2010, Hist], Now: Sat Apr 3 15:00:25 2010
PERF:    GrpName:        SWs, GrpNumPrts:     35, LstNumPrts:     10,
         LstMaxNumPrts:     10
                    SWs GROUP ERROR STATS INFORMATION

Int                 Max       0+%      25+%      50+%      75+%     100+%
    Integrity         0        27         0         0         0         0
    Congestion        0        27         0         0         0         0
    SmaCongest        0        27         0         0         0         0
    Security          0        27         0         0         0         0
    Routing           0        27         0         0         0         0
    Congest %:  0.0    Discard:      0     Ineffic %:  0.0   Adapt Rt:0
Ext                 Max       0+%      25+%      50+%      75+%     100+%
    Integrity         0         8         0         0         0         0
    Congestion        0         8         0         0         0         0
    SmaCongest        0         8         0         0         0         0
    Security          0         8         0         0         0         0
    Routing           0         8         0         0         0         0
    Congest %:  0.0    Discard:      0     Ineffic %:  0.0   Adapt Rt:0
SUBMENU: (+), (p)rvPg, (e)rr<1-6>, Ls(t)<n>, Im(g)Info
```

Figure 4-62. Switch Group Error Condition Selection Screen

Integrity Error Selection Screen

After selecting the **(e)rr<1>** sub-menu selection, for ports associated with links that have integrity related errors, a list of links is displayed to the user. Figure 4-63 is an example of the screen that will be displayed.

```
MENU:    (H)ome, (I)nfrastructureView, (F)abricView, (A)dmin, (Q)uit
VIEW:    [P]:H:IntegErr
CONTEXT: Name: Integrity Error
FABRIC:  Top: [Tue Feb 2 07:31:25 2010, Hist], Now: Tue Feb 2 07:51:50 2010
PERF:    GrpName: SWs, GrpNumPrts: 94, LstNumPrts: 10,
         LstMaxNumPrts: 10, NodesFailed: 0, NodesSkipped: 0,
                   PortsFailed: 0, PortsSkipped: 9
```

```
                        INTEGRITY ERROR PORTS LISTING

CID   PORT NO     LID     VAL       Node GUID           NODE DECS
 1     13       0x0003   0.0    0x00066a00d9000479   i9k479
        9       0x0400   0.0    0x00066a0007000e6d   SilverStorm 9080 GUID=
 2     18       0x0003   0.0    0x00066a00d9000479   i9k479
        1       0x0100   0.0    0x00066a0098007b70   stewie HCA-1
 3     20       0x0003   0.0    0x00066a00d9000479   i9k479
        1       0x0f00   0.0    0x0002c9020025a678   mindy2 HCA-1
 4      7       0x0004   0.0    0x00066a0007000e6d   SilverStorm 9080 GUID=
        2       0x0200   0.0    0x00066a0098007b70   stewie HCA-1
 5     13       0x0004   0.0    0x00066a0007000e6d   SilverStorm 9080 GUID=
       10       0x0500   0.0    0x00066a100600025a   SilverStorm 9080 GUID=
```

```
SUBMENU: (+), (p)rvPg, (u)til<h|l>, Ls(t)<n>, Im(g)Cfg
```

Figure 4-63. Integrity Error Selection Screen

Link Selection Screen

Figure 4-64 is an example of the screen for selecting the information to display for a specific link within the fabric.

```
MENU:    (H)ome, (I)nfrastructureView, (F)abricView, (P)erformanceView,
         (T)opContext, (A)dmin, (Q)uit
VIEW:    [P]:H:IntegErr
CONTEXT: Name: Integrity Error
FABRIC:  Img: [Sat Apr 3 14:29:23 2010, Hist], Now: Sat Apr 3 15:06:05 2010
PERF:    GrpName:        SWs, GrpNumPrts:     35, LstNumPrts:     10,
         LstMaxNumPrts:     10, NodesFailed:      0, NodesSkipped:      0,
         PortsFailed:      0, PortsSkipped:      3

                    INTEGRITY ERROR PORTS LISTING

CID   PORT NO     LID     VAL        Node GUID              NODE
1           1   0x0002       0   0x00066a00070014dc  SilverStorm 9040 GUID=
            1   0x0001       0   0x00066a009800ec5b  admin1 HCA-1
2           2   0x0002       0   0x00066a00070014dc  SilverStorm 9040 GUID=
            1   0x0003       0   0x00066a009800ec51  compute0001 HCA-1
3           7   0x0002       0   0x00066a00070014dc  SilverStorm 9040 GUID=
            1   0x0004       0   0x00066a009800ec5a  compute0006 HCA-1
4           8   0x0002       0   0x00066a00070014dc  SilverStorm 9040 GUID=
            1   0x0006       0   0x00066a009800ec47  compute0007 HCA-1
5           9   0x0002       0   0x00066a00070014dc  SilverStorm 9040 GUID=
            1   0x0008       0   0x00066a009800ec73  compute0002 HCA-1
SUBMENU: (+), (p)rvPg, Scrl(d)wn, (cC)rit, Im(g)Info
```

Figure 4-64. Link Selection Screen

Admin Menu Screens

Main Screen

Figure 4-65 is the main screen of the Admin menu selection, which enables a user to perform administration related operations with RFM

```
MENU:     (H)ome, (Q)uit
VIEW:     [A]:H
CONTEXT: Name: Admin

CID  ADMIN OPERATIONS
 1      Performance View Configuration
 2      Infrastructure View Configuration
 3      Fabric View Configuration
 4      General Configuration

SUBMENU: (p)rvPg
```

Figure 4-65. Admin Menu Main Screen

NOTE:

In the present release only the Performance View Configuration category is implemented.

Fabric Discovery Screen

Figure 4-66 is the screen for viewing results from the execution of a fabric discovery operation.

```
# iba_rfm
Please wait, while the fabric is being discovered...
Beginning Fabric Discovery...
Getting general information about all PM groups
Getting All Node Records...
Done Getting All Node Records
Done Getting All Link Records
Done Getting All SM Info Records
Getting All PA Port Counters...
Done Getting All PA Port Counters
Completed Topology related discovery: OK
Completed enhanced PM related discovery: OK
FABRIC DISCOVERY SUMMARY
Total Nodes:             48
Total Switch Nodes:      20
Total CA Nodes:          28
Total Router Nodes:       0
Total SMs:                1
Completed Topology related discovery: OK
Completed enhanced PM related discovery: OK



[Press the Enter key to continue]
```

Figure 4-66. Fabric Discovery Screen

5 Configuration of IPoIB Name Mapping

The FastFabric tools support the concept of a management network and an IPoIB network. For some clusters the management network will be a low speed network such as 10/100 Ethernet. For other clusters IPoIB may serve double duty as the host management network.

NOTE:

When using IPoIB as the management network, the initial installation of InfiniBand software cannot be done using FastFabric.

The various FastFabric tools will translate from host names provided to and from IPoIB names as needed. This permits the host names given to be either management network or IPoIB network names. The default configuration file assumes that IPoIB host names are formed by adding a **`-ib`** suffix to the management network name. If a different suffix is desired, `FF_IPOIB_SUFFIX` can be changed. If IPoIB is also being used as the management network, `FF_IPOIB_SUFFIX` can be set to an empty string `""`.

The translation is driven by the following functions within `fastfabric.conf`:

`ff_host_basename` - given a management network or IPoIB hostname, translate to management network name, should match hostname -s

`ff_host_basename_to_ipoib` - given a management network name, translate to IPoIB hostname

More complex mappings can be specified by implementing alternate algorithms for these functions.

NOTE:

When managing a cluster where the IPoIB settings on the compute nodes are incompatible with the InfiniBand Management node (for example when a 4K MTU is used on the compute nodes and a 2K MTU is used on the InfiniBand Management Nodes), it is recommended not to run IPoIB on the InfiniBand management nodes.

A FastFabric Configuration Files

Table A-2 list the configuration files that are used by FastFabric. The description in the table also list the following sections that have detailed descriptions of each file. For a given release consult the files with `-sample` at the end of the file name for a sample file with the defaults of the given release.

Table A-2. FastFabric Configuration Files

Configuration File	Description
/etc/sysconfig/fastfabric.conf	Overall configuration file. Refer to FastFabric Configuration File.
/etc/sysconfig/iba/iba_mon.conf	Error thresholds. Refer to Port Statistics Thresholds Configuration File.
/etc/sysconfig/iba/iba_mon.si.conf	Error thresholds related to Signal Integrity. Refer to Signal Integrity Thresholds Configuration File.
/etc/sysconfig/iba/allhosts	List of all hosts managed by FastFabric including the localhost. Refer to Host List Files.
/etc/sysconfig/iba/hosts	List of all hosts managed by FastFabric except the localhost. Refer to Host List Files.
/etc/sysconfig/iba/chassis	List of all chassis managed by FastFabric. Refer to Chassis List Files.
/etc/sysconfig/iba/esm_chassis	List of all chassis running an embedded SM which are to be monitored using esm_analysis. Refer to Chassis List Files.
/etc/sysconfig/iba/ibnodes	List of all externally managed switches managed by FastFabric. Refer to Externally Managed Switch List File.
/etc/sysconfig/iba/ports	List of local HCA ports (for example subnets) to be used for fabric health analysis. Refer to Port List File.

Table A-2. FastFabric Configuration Files

Configuration File	Description
/etc/sysconfig/iba/topology.0:0.xml	Fabric topology input file used by iba_reports and fabric health tools. Refer to Fabric Topology Input File.

FastFabric Configuration File

The FastFabric tools support a configuration file `/etc/sysconfig/fastfabric.conf`. This file can be used to provide default settings for most of the FastFabric command line options. The configuration file is a bash shell script which will be included by each tool. As such the file should be implemented such that environment variables defined before the con fig file is executed will not be altered. The sample displayed below makes use of the bash syntax:

```
var= "${var:-value}"
```

such that only uninitialized variables are overwritten by the configuration file.

An example of a sample file is provided, and matches the internal defaults of the FastFabric tools. For a given release consult `/etc/sysconfig/fastfabric.conf-sample` for a sample file with the defaults of the given release. If `fastfabric.conf` does not assign a value to a given configuration variable, the default value will be used.

NOTE:

Do not edit `/etc/sysconfig/fastfabric.conf-sample`.

The use of various configuration variables are discussed in the Environment Variables section for each command.

```
#!/bin/bash
# [ICS VERSION STRING: @(#) ./fastfabric/ib_tools/defaults x_x_x_x_x [MM/DD/YY hh:mm]
# This is a bash sourced config file which defines variables used in
# fast fabric tools.  Command line arguments will override these settings.
# Assignments should be scripted such that this file does not override
# exported environment settings, as shown in the defaults below

if [ "$CONFIG_DIR" = "" ]
then
if [ -d /etc/sysconfig ]
then
CONFIG_DIR=/etc/sysconfig
else
CONFIG_DIR=/etc
fi
```

```
export CONFIG_DIR
fi

# Override default location for HOSTS_FILE
export HOSTS_FILE=${HOSTS_FILE:-$CONFIG_DIR/iba/hosts}

# Override default location for CHASSIS_FILE
export CHASSIS_FILE=${CHASSIS_FILE:-$CONFIG_DIR/iba/chassis}

# Override default location for ESM_CHASSIS_FILE
export ESM_CHASSIS_FILE=${ESM_CHASSIS_FILE:-$CONFIG_DIR/iba/esm_chassis}

# Override default location for IBNODES_FILE
export IBNODES_FILE=${IBNODES_FILE:-$CONFIG_DIR/iba/ibnodes}

# Override default location for PORTS_FILE
export PORTS_FILE=${PORTS_FILE:-$CONFIG_DIR/iba/ports}

# Default suffix for IPoIB host names
# the special value "NONE" is used to indicate a value of ""
# this value can be used in ff_host_basename_to_ipoib and ff_host_basename
# below to convert between IPoIB and Ethernet hostnames
export FF_IPOIB_SUFFIX=${FF_IPOIB_SUFFIX:--ib}
# Alternatively a IPoIB prefix can be provided, commented out
# examples in ff_host_basename and ff_host_basename can be enabled if desired
export FF_IPOIB_PREFIX=${FF_IPOIB_PREFIX:-ic-}

# Default management host
export MGMT_HOST=${MGMT_HOST:-localhost}


# The shell functions below are only defined if no existing function/command
# with given name, hence allowing use of shell functions or creation of a
# command for this operation

# shell Function to convert a basic hostname into an IPoIB hostname
# if FF_IPOIB_SUFFIX is "", this should return $1 unmodified
# such that commands can be used with -i "" to skip IPoIB operations
# (special value of NONE will be converted to "" before this is called)
if ! type ff_host_basename_to_ipoib >/dev/null 2>/dev/null
then
function ff_host_basename_to_ipoib()
{
# $1 = hostname provided
echo "$1$FF_IPOIB_SUFFIX"
# comment out line above and uncomment line below if using prefixes
#echo "$FF_IPOIB_PREFIX$1"
}
fi

# shell Function to convert a hostname into a basic hostname
# (eg. remove IPoIB suffix, etc) should match result of "hostname -s" on host
# if FF_IPOIB_SUFFIX is "", this should return $1 unmodified
# such that commands can be used with -i "" to skip IPoIB operations
# (special value of NONE will be converted to "" before this is called)
if ! type ff_host_basename >/dev/null 2>/dev/null
then
function ff_host_basename()
{
```

```
# $1 = hostname provided (could be ethernet or IPoIB name)
echo "$1"|sed -e "s/$FF_IPOIB_SUFFIX\$//"
# comment out line above and uncomment line below if using prefixes
#echo "$1"|sed -e "s/^$FF_IPOIB_PREFIX//"
}
fi

# IP netmask for IPoIB subnet [-m option]
# if "" default will be determined based on class of IP address [A, B, C]
export FF_IPOIB_NETMASK=${FF_IPOIB_NETMASK:-}

# Maximum parallel processes for ibtest and -p option on other commands
# set to 1 to avoid parallel execution
export FF_MAX_PARALLEL=${FF_MAX_PARALLEL:-20}

# If the systems are slow for some reason, this can be used to provide a
# multiplier for all timeouts in ibtest, iba_host_admin, iba_chassis_admin,
# iba_switch_admin
export FF_TIMEOUT_MULT=${FF_TIMEOUT_MULT:-2}

# where to put result files from FastFabric runs of
# ibtest, iba_host_admin, iba_chassis_admin, iba_switch_admin
#export FF_RESULT_DIR=${FF_RESULT_DIR:-.}
export FF_RESULT_DIR=${FF_RESULT_DIR:-$HOME}

# QLogic IB product to install during iba_host_admin load and upgrade
export FF_PRODUCT=${FF_PRODUCT:-QLogicIB-Basic.`cat /etc/sysconfig/iba/osid_wrapper`}

# QLogic IB product version to install during iba_host_admin load and upgrade
export FF_PRODUCT_VERSION=${FF_PRODUCT_VERSION:-`cat /etc/sysconfig/iba/version_wrapper
2>/dev/null`}

# QLogic IB packages to install during iba_host_admin load [-P option]
#export FF_PACKAGES=${FF_PACKAGES:-iba ipoib verbs_mpi}
#export FF_PACKAGES=${FF_PACKAGES:-iba ipoib psm_mpi}
export FF_PACKAGES=${FF_PACKAGES:-iba ipoib mpi}

# Additional INSTALL options during iba_host_admin load [-I option]
#export FF_INSTALL_OPTIONS=${FF_INSTALL_OPTIONS:- -D iba_mon -D s20tune -E qlogic_sa}
export FF_INSTALL_OPTIONS=${FF_INSTALL_OPTIONS:- -D iba_mon -D s20tune}

# Additional INSTALL options during iba_host_admin upgrade [-U option]
#export FF_UPGRADE_OPTIONS=${FF_UPGRADE_OPTIONS:- -D iba_mon -D s20tune -E qlogic_sa}
export FF_UPGRADE_OPTIONS=${FF_UPGRADE_OPTIONS:- -D iba_mon -D s20tune}

# where to upload server specific files to during uploadall, captureall
# [-d option]
export UPLOADS_DIR=${UPLOADS_DIR:-./uploads}

# where to download server specific files from during downloadall
# [-d option]
export DOWNLOADS_DIR=${DOWNLOADS_DIR:-./downloads}

# where to save history and baselines for cluster analysis and health checks
# [-d option]
export FF_ANALYSIS_DIR=${FF_ANALYSIS_DIR:-/var/opt/iba/analysis}

# topology input file(s) to use for fabric_analysis, all_analysis and
# iba_reports operations.  The %P marker will be replaced with the
```

```
# local HCA port/fabric selection string (for example 0:0 or 1:2) for
# the fabric being selected (see PORTS_FILE for more information)
# if this file is not found, or the value of this parameter is "NONE"
# no topology input file will be used
export FF_TOPOLOGY_FILE=${FF_TOPOLOGY_FILE:-$CONFIG_DIR/iba/topology.%P.xml}

# How to login to host systems during iba_host_admin
# can be ssh, rsh or telnet
# Note: at present cmdall and scpall always assume password-less ssh/scp
# Note: check_rsh always assumes password-less rsh/rcp
# Note: arguments (-s) to setup_ssh select ssh setup via rsh/rcp or ssh/scp
export FF_LOGIN_METHOD=${FF_LOGIN_METHOD:-ssh}

# initial user name (cannot be root if CFG_LOGIN_METHOD=telnet)
export FF_USERNAME=${FF_USERNAME:-root}

# password for FF_USERNAME (not needed if password-less ssh/rsh configured)
export FF_PASSWORD=${FF_PASSWORD:-}

# if FF_USERNAME is not root, what is the root password needed when
# suing to root
export FF_ROOTPASS=${FF_ROOTPASS:=}

# How to login to chassis
# can be ssh or telnet
export FF_CHASSIS_LOGIN_METHOD=${FF_CHASSIS_LOGIN_METHOD:-ssh}

# password for admin (not needed if password-less ssh configured)
export FF_CHASSIS_ADMIN_PASSWORD=${FF_CHASSIS_ADMIN_PASSWORD:-adminpass}

#base device number for IPoIB devices - IPoIB devices in the systems will
# be named "ib($FF_IPOIB_BASE_DEV_NUM) ib($FF_IPOIB_BASE_DEV_NUM+1) ..."
# On Silvertstorm stack it will be "ib1 ib2 ...."
# On OFED stack it will be "ib0 ib1 ..."
export FF_IPOIB_BASE_DEV_NUM=${FF_IPOIB_BASE_DEV_NUM:-0}

# shell Function to return the base IPoIB device number for this stack type.
# For Silverstorm stack installations this function should return 1, for
# OFED stack installations this should return 0.
if ! type ff_ipoib_base_dev_num >/dev/null 2>/dev/null
then
function ff_ipoib_base_dev_num()
{
# No arguments to this function
        # $host is supplied as an arguemnt when this function is called
        # but it is ignored here. This is a hack to limit the number of
# changes required.
echo "$FF_IPOIB_BASE_DEV_NUM"
}
fi

# options for iba_report during fabric_analysis health check
# alternative would be to use "-i seconds" instead of -C
# depending on fabric design, more strict link speed checks, such as
# -o slowconfiglinks or -o slowconnlinks may be appropriate
export FF_FABRIC_HEALTH=${FF_FABRIC_HEALTH:- -s -C -o errors -o slowlinks}

# list of CLI commands to issue during chassis_analysis
```

```
export FF_CHASSIS_CMDS=${FF_CHASSIS_CMDS:-showInventory fwVersion showIBNodeDesc
ismShowPStatThresh ismChassisSet12x timeZoneConf timeDSTConf snmpCommunityConf
snmpTargetAddr showChassisIpAddr showDefaultRoute}
# other possible additions (if running newer chassis FW which supports these)
# ismIslSet12x, ismIslSetSpeed

# single CLI command to issue to check overall health during chassis_analysis
# hwCheck is prefered, but is not supported on older chassis FW
export FF_CHASSIS_HEALTH=${FF_CHASSIS_HEALTH:-hwCheck}
#export FF_CHASSIS_HEALTH=${FF_CHASSIS_HEALTH:-fruInfo}

# list of CLI commands to issue during esm_analysis
export FF_ESM_CMDS=${FF_ESM_CMDS:-smShowSMParms smShowDefBcGroup}

# list of analysis to perform during all_analysis
# pick appropriate type of SM to analyze
#export FF_ALL_ANALYSIS=${FF_ALL_ANALYSIS:-fabric chassis hostsm esm}
export FF_ALL_ANALYSIS=${FF_ALL_ANALYSIS:-fabric chassis}

# command to perform text files for baseline vs latest snapshot during
# fabric health analysis commands
#export FF_DIFF_CMD=${FF_DIFF_CMD:-diff}
export FF_DIFF_CMD=${FF_DIFF_CMD:-diff -C 1}

# env variables to set within each rank of MPI runs done by fastfabric directly
# alternatively the /opt/iba/src/mpi_apps/ofed.*.param files can be edited
# with appropriate values.
# example of PSM selection of vFabric by PKEY/SL
#export FF_MPI_ENV=${FF_MPI_ENV:-PSM_PKEY=0xffff IPATH_SL=0}
# example of PSM selection of path and vFabric by query to qlogic_sa
#export FF_MPI_ENV=${FF_MPI_ENV:-PSM_PATH_REC=opp PSM_IB_SERVICE_ID=0x1000117500000000}
# example of PSM selection of path and vFabric by default query to qlogic_sa
#export FF_MPI_ENV=${FF_MPI_ENV:-PSM_PATH_REC=opp}
export FF_MPI_ENV=${FF_MPI_ENV:-}

# configuration of arguments for MPI performance deviation testing
# via /opt/iba/src/mpi_apps/deviation/deviation
# The defaults should work for most fabrics.  This can be made stricter
# and/or specific to the fabric by using arguments such as -h hostname
# -bwthres and -latthres.  See run_deviation or the user's guide for more
# information.
#export FF_DEVIATION_ARGS=${FF_DEVIATION_ARGS:--bwtol 20 -lattol 50 -c -v}
#export FF_DEVIATION_ARGS=${FF_DEVIATION_ARGS:--bwtol 20 -lattol 50 -c -h hostname}
export FF_DEVIATION_ARGS=${FF_DEVIATION_ARGS:--bwtol 20 -lattol 50 -c}


# input to iba_host_admin configipoib indicating which mode to
# use for IP configuration of ipoib interface, valid values are one of
# static, dhcp , auto
export FF_IPOIB_CONFIG=${FF_IPOIB_CONFIG:-static}
```

Port Statistics Thresholds Configuration File

The `/etc/sysconfig/iba/iba_mon.conf` configuration file defines port statistics thresholds for use by `iba_report`, `fabric_analysis`, `all_analysis` and `iba_mon`.

This file lists a threshold for each port statistic. If the threshold for a given statistic is not defined or is set to 0, the given statistic will not be checked.

An example of a sample file is provided, and matches the internal defaults of the FastFabric tools. For a given release consult `/etc/sysconfig/iba/iba_mon.conf-sample` for a sample file with the defaults of the given release

NOTE:

Do not edit `/etc/sysconfig/iba/iba_mon.conf-sample`.

```
# This file controls the iba_mon Port Counter monitoring Thresholds.
# [ICS VERSION STRING: @(#) ./config/iba_mon.conf x_x_x_x_x [MM/DD/YY hh:mm]
#
# Error Counters are specified in absolute number of errors over Interval.
# All Data Movement thresholds are specified in terms of average data/second
# over the monitoring interval.
#
# Setting a threshold to 0 disables monitoring of the given counter
#
# Output is generated when a threshold is exceeded.
#
# Counters for which a non-zero threshold is specified will be cleared by
# iba_mon and may impact any remote Performance Managers which are monitoring
# the given Counter

Interval10# monitoring interval in seconds

SyslogFacility              local6# syslog facility code, or disable

ThresholdGreater# how compare counter to threshold
# alternative value is Equal

# Normal Data Movement
PortXmitData                     0# as MB/second
PortRcvData                      0# as MB/second
PortXmitPkts                     0# as packets/second
PortRcvPkts                      0# as packets/second

# Error Counters
SymbolErrorCounter             100
LinkErrorRecoveryCounter         3
LinkDownedCounter                3
PortRcvErrors                  100
PortRcvRemotePhysicalErrors      0# side effect of errors elsewhere, ignore
#PortRcvSwitchRelayErrors       100# known Anafa2 issue, incorrectly increments
PortXmitDiscards               100
PortXmitConstraintErrors        10
```

```
PortRcvConstraintErrors          10
LocalLinkIntegrityErrors          3
ExcessiveBufferOverrunErrors      3
#VL15Dropped                     100 # expected to optimize SM sweep time
```

NOTE:

When this file is used by iba_mon, the thresholds represent counts per “Interval”. However, when used by `iba_report` or fabric health tools, the counts are absolute values and are applied against the counters as found in the system

Signal Integrity Thresholds Configuration File

The `/etc/sysconfig/iba/iba_mon.si.conf` configuration file defines port counter signal integrity thresholds.

This file allows analysis for any non-zero error counters related to Signal Integrity (bad cables, etc) and can be used by adding the `-c` option to `iba_report`, `iba_extract_error` and other related fastfabric tools.

An example of a sample file is provided, and matches the internal defaults of the FastFabric tools.

NOTE:

Do not edit `/etc/sysconfig/iba/iba_mon.conf-sample`.

```
# This file controls the iba_mon Port Counter monitoring Thresholds.
# [ICS VERSION STRING: @(#) ./config/iba_mon.si.conf x_x_x_x_x [MM/DD/YY hh:mm]

# This is a variation of the default iba_mon.conf file.  This file only
# checks error counters related to Signal Integrity.  Thresholds are set
# such that any and all non-zero counters will be visible.  This can be
# useful when using iba_report -o errors, iba_extract_error, and other
# related tools.  For many FastFabric tools this filename can be specified by
# the -c option.

#
# Error Counters are specified in absolute number of errors over Interval.
# All Data Movement thresholds are specified in terms of average data/second
# over the monitoring interval.
#
# Setting a threshold to 0 disables monitoring of the given counter
#
# Output is generated when a threshold is exceeded.
#
# Counters for which a non-zero threshold is specified will be cleared by
# iba_mon and may impact any remote Performance Managers which are monitoring
# the given Counter

Interval10# monitoring interval in seconds

SyslogFacility              local6# syslog facility code, or disable

ThresholdEqual# how compare counter to threshold
```

```
# alternative value is Greater

# Normal Data Movement
PortXmitData                    0# as MB/second
PortRcvData                     0# as MB/second
PortXmitPkts                    0# as packets/second
PortRcvPkts                     0# as packets/second

# Error Counters
SymbolErrorCounter              1
LinkErrorRecoveryCounter        1
LinkDownedCounter               1
PortRcvErrors                   1
PortRcvRemotePhysicalErrors     0# side effect of errors elsewhere, ignore
PortRcvSwitchRelayErrors        0# not related to SI
PortXmitDiscards                0# not related to SI
PortXmitConstraintErrors        0# not related to SI
PortRcvConstraintErrors         0# not related to SI
LocalLinkIntegrityErrors        1
ExcessiveBufferOverrunErrors    1# can be side effect of SI
VL15Dropped                     0 # expected to optimize SM sweep time
```

Host List Files

The `/etc/sysconfig/iba/hosts` and `/etc/sysconfig/iba/allhosts` files are used to specify the hosts which FastFabric will operate against for many operations.

If desired alternate filenames may be specified in `fastfabric.conf`, using environment variables or on the command line. Refer to *FastFabric Command Line Interface Reference Guide* for more information.

Below is a sample host list file:

```
# [ICS VERSION STRING: @(#) ./fastfabric/ib_tools/allhosts x_x_x_x_x [MM/DD/YY hh:mm]
# This file lists the TCP/IP names of ALL the hosts in the cluster.
# THIS SHOULD INCLUDE THE NODE RUNNING FASTFABRIC
#
# If Ethernet is being used for the management network, specify
# the hostname corresponding to the ethernet IP address.
# This file will be used by FastFabric to indicate which hosts should be
# operated on by various fastfabric menus and CLI commands.

include /etc/sysconfig/iba/hosts
# add line below with TCP/IP name of FastFabric host (eg. this host)
```

Each line of the host list file may specify a single host, a comment or another host list file to include.

Hosts may be specified by IP address or a resolvable TCP/IP hostname. Typically hostnames are used for readability. Also, some FastFabric tools will translate the supplied host names to IPoIB hostnames, in which case names are generally easier to translate than numeric IP addresses. Typically management network host names are specified. However, if desired, IPoIB hostnames or IP addresses may be used. This can accelerate large file transfers and other operations.

Files to be included may be specified using an `include` directive followed by a file name. File names specified should generally be absolute path names. If relative path names are used, they will be searched for within the current directory then `/etc/sysconfig/iba`.

Comments may be placed on any line by using a `#` to precede the comment. On lines with hosts or include directives, the `#` must be white-space separated from any preceding host name, IP address or included file name.

Chassis List Files

The `/etc/sysconfig/iba/chassis` and `/etc/sysconfig/iba/esm_chassis` files are used to specify the QLogic InfiniBand chassis that FastFabric will operate against for many operations.

If desired alternate filenames may be specified in `fastfabric.conf`, using environment variables or on the command line. Refer to *FastFabric Command Line Interface Reference Guide* for more information.

The following is a sample chassis file:

```
# [ICS VERSION STRING: @(#) ./fastfabric/ib_tools/chassis x_x_x_x_x [MM/DD/YY hh:mm]
# This file lists the TCP/IP names of the QLogic 9000 and 12000
# Internally Managed Switches in the cluster.
#
# If Ethernet is being used for the management network, specify
# the name corresponding to the ethernet IP address of the chassis.
# This file will be used by FastFabric to indicate which chassis should be
# operated on by various fastfabric menus and CLI commands.
```

Each line of the chassis list file may specify a single chassis, a comment or another chassis list file to include.

Chassis may be specified by chassis management network IP address or a resolvable TCP/IP name. Typically, names are used for readability.

Files to be included may be specified using an `include` directive followed by a file name. File names specified should generally be absolute path names. If relative path names are used, they will be searched for within the current directory then `/etc/sysconfig/iba`.

Comments may be placed on any line by using a `#` to precede the comment. On lines with chassis or include directives, the `#` must be white-space separated from any preceding name, IP address or included filename.

The `iba_gen_chassis` command can be used to help locate chassis in the fabric and generate a chassis file.

Selection of slots within a chassis

Normally, operations are performed against the management card in the chassis. For operations such as `cmdall`, the command is executed against the management interface for the given chassis. For more sophisticated operations, such as firmware update, a directory with firmware for each chassis card type can be supplied and all cards in the chassis will be updated with the appropriate firmware from that directory.

However, in some cases it may be desirable to perform operations against a specific subset of cards within the chassis. In this case the chassis IP address, name within a chassis list or a chassis file can be augmented with a list of slot numbers to operate on. This is done in the form:

```
chassis:slot1,slot2,…
```

For example:

```
i9k229:0
i9k229:0,1,5
192.168.0.5:0,1,5
```

NOTE:

There must be no spaces within the chassis name and/or slot list.

This format is used by `cmdall` and chassis firmware update. This format may be used anywhere a chassis name or IP address is valid, such as the `-H` option, the `CHASSIS` environment variable or chassis list files. The slot number specified is ignored on some operations (such as `pingall`). Only slots containing management cards, EVICs and FVICs may be specified with this format. For all 9000 series chassis, slot 0 is always an alias for the presently active management card for the chassis. For the remainder of slot usages in the chassis, the `chassisQuery` command can be executed against a given chassis to identify which slots have management, EVIC or FVIC cards.

NOTE:

For any operation, care should be taken that a given chassis is listed only once with all relevant slots as part of that single specification. This is important so that parallel operations do not cause conflicting concurrent operations against a given chassis.

Externally Managed Switch List File

The `/etc/sysconfig/iba/ibnodes` file is used to specify the externally-managed QLogic InfiniBand switches that FastFabric will operate against for many operations.

Alternate file names may be specified in `fastfabric.conf`, using environment variables or on the command line. Refer to *FastFabric Command Line Interface Reference Guide* for more information.

The following is a sample `ibanodes` file:

```
# [ICS VERSION STRING: @(#) ./fastfabric/ib_tools/ibnodes x_x_x_x_x [MM/DD/YY hh:mm]
# This file lists all the QLogic 9000 and 12000 Externally Managed Switches
#
# specify one line per switch of the form guid,nodeDesc,distance
#  guid - node guid of the switch
#  nodeDesc - optional node description which should be programmed into
#      the switch by FastFabric.  It is recommended to supply a unique
#      nodeDesc for each switch to simplify management of the cluster.
#  distance - optional relative distance of the switch from the FastFabric node
#      this is used by reboot operations to first operate on switches furthest
#      from the FastFabric node.
#      Nodes without a distance specified will be treated as furthest.
# For fabrics with multiple IB subnets, the local hca and port to use may be
# specified as: guid:hca:port,nodeDesc,distance.
# See the FastFabric Manual for more info
#
# The iba_gen_ibnodes tool can be used to query the SM and generate a list
# Externally Managed switches in the proper form for this file.
#
# for example:
# 0x00066a00e300299f,SwitchA1,2
```

Each line of the switch list file may specify a single switch, a comment, or another switch list file to include.

Switches can be specified by node GUID optionally followed by a colon and the hca:port, optionally followed by a comma and the IB Node Description (nodename) to be assigned to the switch, and optionally followed by the distance value indicating the relative distance from the FastFabric node for each switch.

The `iba_gen_ibnodes` can be used to help locate externally managed switches in the fabric and generate an `ibnodes` file. The `iba_gen_ibnodes` tool will by default provide the proper distance value relative to the FastFabric node from which it was run. This capability requires use of IBTA standard TraceRecord queries which are not supported by openSM, but can be supplied by the QLogic Fabric Manager. Alternatively the `iba_gen_ibnodes -R` option can suppress generation of this field. See the *QLogic FastFabric Command Line Interface Reference Guide* for more information.

In a typical pure fat tree topology with externally managed switches as edge switches and internally managed switches as core switches, the user can also easily manually specify proper distance by simply specifying 1 for the distance value of the switch next to the FastFabric node. Note that in such a topology all other switches are an equal length from the FastFabric node and a missing distance value will cause them to be treated as having a distance value which is larger than any other found in the file. Therefore the other switches would be rebooted first and the FastFabric node's switch would be rebooted last.

The GUID will be used to select the switch and on firmware update operations, the node description will be written to the switch such that other FastFabric tools (such as `iba_aquery` and `iba_report`) can provide a more easily readable name for the switch. The node description can also be updated as part of switch basic configuration.

The hca:port may be used to specify which local port (subnet) to use to access the switch. If this is omitted, all local ports specified will be checked for the switch and the first port found to be able to access the switch will be used to access it. See the *FastFabric Command Line Interface Reference Guide* for more information about how to specify and hca:port value.

Files to be included may be specified using an `include` directive followed by a file name. File names specified should generally be absolute path names. If relative path names are used, they will be searched for within the current directory then `/etc/sysconfig/iba`.

Comments may be placed on any line. By using a `#` to precede the comment. On lines with chassis or include directives, the `#` must be white-space separated from any preceding GUID, name or included file name.

QLogic recommends that a unique node description be specified for each switch. This name should follow typical naming rules and use the characters a-z, A-Z, 0-9, and underscore. No spaces are allowed in the node description. Additionally, names should not start with a digit.

For externally-managed switches, the node GUID can be found on a label on the bottom of the switch. Alternately the node GUIDs for switches in the fabric can be found using a command such as:

```
iba_saquery -t sw -o nodeguid
```

NOTE:

The preceding command will report all switch node GUIDs, including those of internally-managed chassis such as the QLogic 12000 or SilverStorm 9120. GUIDs for internally-managed chassis cannot be specified for use in the `ibnodes` file.

FastFabric is topology aware when updating externally managed switch firmware or resetting the switches. Switches furthest from the FastFabric node are updated or reset first and then each switch, working toward the FastFabric node. This way switches that are rebooted are not in the path between the FastFabric node and others that are being rebooted.

The ordering is controlled by an optional **distance** field in the `ibnodes` file or the `ibnodes` provided on the command line. The **distance** field indicates the relative distance from the FastFabric node for each switch. Any `ibnodes` file entries which do not specify a distance value are treated as having a value larger than any others in the file. The `ibnodes` file contains any of these formats per line:

```
nodeguid
nodeguid,,distance
nodeguid:hca:port
nodeguid:hca:port,,distance
nodeguid,nodename
nodeguid,nodename,distance
nodeguid:hca:port,nodename
nodeguid:hca:port,nodename,distance
```

The `iba_gen_ibnodes` tool by default, provides the proper distance value relative to the FastFabric node on which it ran. This capability requires the use of IBTA standard TraceRecord queries which are not supported by openSM, but can be supplied by QLogic FM. Alternatively, the `iba_gen_ibnodes -R` option can suppress generation of this field.

In a typical pure fat tree topology with externally managed switches as edge switches and internally managed switches as core switches, the user can also manually specify proper distance by simply specifying 1 for the distance value of the switch next to the FastFabric node. Note that in such a topology all other switches are an equal length from the FastFabric node and a missing hops value will cause them to be treated as having a distance value which is larger than any other found in the file. Therefore, the other switches would be rebooted first and the FastFabric node's switch would be rebooted last.

Port List File

The `/etc/sysconfig/iba/ports` file is used to specify the local HCA ports (i.e., subnets) that FastFabric will use for assorted commands (such as `iba_reports`, `fabric_info`, `iba_switch_admin`, `fabric_analysis`, `all_analysis`) for fabric access.

Alternate filenames may be specified in `fastfabric.conf`, using environment variables or on the command line. Refer to *FastFabric Command Line Interface Reference Guide* for more information.

The following is a sample port list file:

```
# [ICS VERSION STRING: @(#) ./fastfabric/ib_tools/ports x_x_x_x_x [MM/DD/YY hh:mm]
# This file defines the local HCA ports to use to access the fabric(s)
#
# specify one line per HCA port of the form hca:port such as:
#       0:0 = 1st active port in system
#       0:y = port y within system
#       x:0 = 1st active port on HCA x
#       x:y = HCA x, port y
# The first HCA in the system is 1.  The first port on an HCA is 1.
0:0
```

Each line of the port list file may specify a single port, a comment or another port list file to include.

Ports are specified as `hca:port`. No spaces are permitted. The first Host Channel Adapter is 1 and the first port is 1. The special value 0 for Host Channel Adapter or port has special meaning. The allowed formats are shown in the previous sample.

Files to be included may be specified using an `include` directive followed by a file name. File names specified should generally be absolute path names. If relative path names are used, they will be searched for within the current directory then `/etc/sysconfig/iba`.

Comments may be placed on any line. By using a `#` to precede the comment. On lines with a port or include directive, the `#` must be white-space separated from any preceding port or included file name.

Fabric Topology Input File

The `/etc/sysconfig/iba/topology.0:0.xml` file is used to specify the expected fabric topology and augmented fabric information (such as cable labels, types, lengths, SM details, node details, link details, etc). If present this file will be used by assorted FastFabric commands (such as `iba_reports`, `fabric_analysis`, `all_analysis`). Refer to the *FastFabric Command Line Interface Reference Guide* for more information on how to create a topology file describing the fabric.

If desired, alternate filenames may be specified in `fastfabric.conf`, using environment variables or on the command line. Refer to *FastFabric Command Line Interface Reference Guide* for more information.

The XML format of topology input can appear as follows (the example below is purposely brief and omits many links, nodes, and SMs):

```
<?xml version="1.0" encoding="utf-8" ?>
<Report>
<LinkSummary>
      <Link>
            <Rate>20g</Rate>
            <MTU>2048</MTU>
            <Internal>0</Internal>
            <LinkDetails>Bender to Switch</LinkDetails>
            <Cable>
                  <CableLength>11m</CableLength>
                  <CableLabel>S4567</CableLabel>
                  <CableDetails>gore cable model 456</CableDetails>
            </Cable>
            <Port>
                  <NodeGUID>0x0002c9020020e004</NodeGUID>
                  <PortGUID>0x0002c9020020e005</PortGUID>
                  <PortNum>1</PortNum>
                  <NodeType>CA</NodeType>
                  <NodeDesc>bender HCA-1</NodeDesc>
                  <PortDetails>bender primary port</PortDetails>
            </Port>
            <Port>
                  <NodeGUID>0x00066a0007000df6</NodeGUID>
                  <PortNum>1</PortNum>
                  <NodeType>SW</NodeType>
                  <NodeDesc>i9k159 Leaf 4, Chip A</NodeDesc>
            </Port>
      </Link>
      <Link>
            <Rate>20g</Rate>
            <MTU>2048</MTU>
            <Internal>0</Internal>
            <Port>
                  <NodeGUID>0x0002c9020025a678</NodeGUID>
                  <PortGUID>0x0002c9020025a679</PortGUID>
```

```
                  <PortNum>1</PortNum>
                  <NodeType>CA</NodeType>
                  <NodeDesc>mindy2 HCA-1</NodeDesc>
            </Port>
            <Port>
                  <NodeGUID>0x00066a0007000e6d</NodeGUID>
                  <PortNum>4</PortNum>
                  <NodeType>SW</NodeType>
                  <NodeDesc>i9k159 Leaf 5, Chip A</NodeDesc>
            </Port>
      </Link>
</LinkSummary>
<Nodes>
      <CAs>
            <Node id="0x0002c9020025a678">
                  <NodeGUID>0x0002c9020025a678</NodeGUID>
                  <NodeDesc>mindy2 HCA-1</NodeDesc>
                  <NodeDetails>mindy2 only HCA</NodeDetails>
            </Node>
      </CAs>
      <Switches>
            <Node id="0x00066a000600025a">
                  <NodeGUID>0x00066a000600025a</NodeGUID>
                  <NodeDesc>i9k159 Spine 1, Chip A</NodeDesc>
                  <NodeDetails>core switch</NodeDetails>
            </Node>
      </Switches>
      <SMs>
            <SM id="0x0002c9020025a678:1">
                  <NodeGUID>0x0002c9020025a678</NodeGUID>
                  <NodeDesc>mindy2 HCA-1</NodeDesc>
                  <PortNum>1</PortNum>
                  <PortGUID>0x0002c9020025a679</PortGUID>
                  <NodeType>CA</NodeType>
                  <NodeType_Int>1</NodeType_Int>
                  <SMDetails>mindy2 SM</SMDetails>
            </SM>
      </SMs>
</Nodes>
</Report>
```

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